

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

3

HEALTH

and

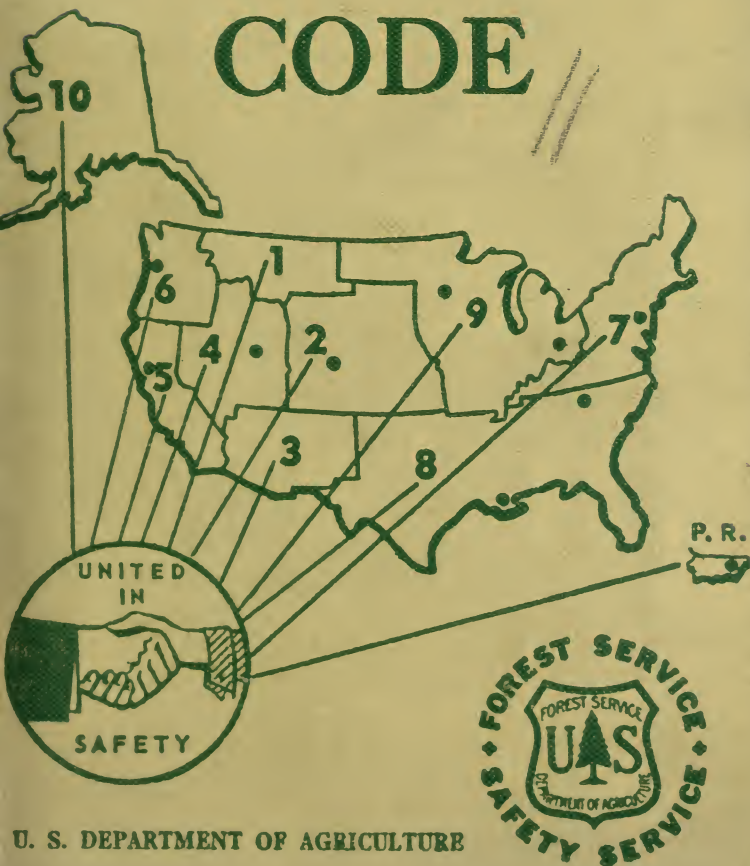
SAFETY CODE

Reserve

A99.61

F76H

1959



U. S. DEPARTMENT OF AGRICULTURE

A PERSONAL MESSAGE TO
EACH MEMBER OF THE FOREST SERVICE

This Safety Code was written for just one purpose: to help you stay alive and unhurt. If this subject is of no interest to you, I see no need for you to read any further. You just don't belong in the Forest Service. I am completely serious. We don't want people in this outfit who are careless with their own lives and with the lives of others.

This Safety Code was written by Forest Service people for Forest Service people. A lot of it is based on bitter experience, experience gained the hard way - by getting hurt - or killed. It isn't pleasant to think about. But don't fool yourself; you can make the same mistakes. None of these other people deliberately intended to get hurt - or killed. It can happen to you.

This Safety Code won't give you all the answers. As yet we don't know all the answers. But it will give you practical, common-sense, basic principles that will help you stay alive, healthy, and in one piece. Making these principles work for your own safety is the job of just one person -- you.

U. S. DEPT. OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY

MAR 11 1963

Richard E. M'Arden
Chief, Forest Service

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

C & R-PREP.

A13.3614 34



CHAPTER AND SECTION LISTING

	Page		Page
1. <u>Policy and Admin.</u>		6. <u>Construction and Maintenance</u>	
Contents	2	Contents	164
.1 Policy	3	.1 Blasting.....	165
.2 Contracts ...	11	.2 Radio and Telephone ...	185
.3 Accident Investigation ..	15	.3 Concrete and Masonry	195
2. <u>Travel</u>		.4 Excavation ..	199
Contents	24	.5 Ladders and Scaffolds	209
.1 Car.....	25	.6 Rigging	219
.2 Air.....	33	.7 Welding.....	227
.3 Foot.....	43	7. <u>Equipment</u>	
.4 Animal	51	Contents	234
.5 Water.....	59	.1 Handtools Including Power	235
3. <u>Fire</u>		.2 Machine.....	247
Contents	70	.3 Safety.....	273
.1 Fire Fighting	71	8. <u>Buildings and Grounds</u>	
.2 Building Protection	83	Contents	282
.3 Flammables.	91	.1 Color Code ..	285
.4 Lightning....	103	.2 Electricity ..	291
4. <u>Public Safety</u>		.3 Laboratories and Chem. ..	299
Contents	108	.4 Offices and Dwellings ...	311
.1 General.....	109	.5 Repair Shops	315
.2 Recreation ..	113	.6 Warehousing.	323
.3 Off the Job ..	117	.7 Wood and Metal Shops .	329
5. <u>Project Work</u>		9. <u>Health</u>	
Contents	124	Contents	342
.1 Firearms ...	125	.1 Policy	343
.2 Forest.....	129	.2 Disease Cont.	347
.3 Sales and Scaling.....	141	.3 Sanitation ...	351
.4 Roads and Trails	147	INDEX.....	357
.5 Cruising and Surveying ...	151		
.6 Fencing.....	155		
.7 Wood Preserving.....	159		
.8 Radioactive..	161		

POLICY & ADMINIS.	TRAVEL	FIRE	PUBLIC	PROJECT WORK	CONSTR. & MTCE.	EQUIPMENT	BLDG. & GROUNDS	HEALTH	INDEX
-------------------	--------	------	--------	--------------	-----------------	-----------	-----------------	--------	-------



CHAPTER 1

POLICY AND ADMINISTRATION

LEGEND

CAPITALIZED TEXT--somebody was
killed by not observing these practices.

SHALL--denotes a mandatory requirement.
The SHALL's are capitalized for easy
reference.

SHOULD--denotes a recommended practice.

It is the duty of each of us
to prevent accidents - and to
protect himself and others
from injury



CHAPTER I. POLICY AND ADMINISTRATION

CONTENTS

SUBJECT	PAGE
1.1 <u>POLICY</u>	
General	3
Regional Foresters	4
Directors	4
Inspectors	5
Supervisory Officers ...	6
Individuals	8
Divisional Responsibilities	9
1.2 <u>CONTRACTS</u>	
Development	11
Inspection	11
Enforcement	11
General Clauses	11
Special Clauses	12
1.3 <u>ACCIDENT INVESTIGATION</u>	
Necessity for Reports...	15
Definitions	15
Reportable Accident ..	15
Disabling Injury	15
Non-Disabling Injury .	16
Property Damage	
Accident	16
Investigations	17
Investigating Officers ...	17
Investigating Procedures	18
The Report	19
Reviewing Officers	21
General	21



1.1 POLICY

1.11 GENERAL

(1) Accident prevention SHALL be undertaken as a definite, aggressive, continuing part of every activity. The active support and participation of our entire personnel SHALL be enlisted.

(2) The policies and procedures in the Forest Service Health and Safety Code SHALL be fully enforced on all jobs.

(3) Accident prevention and safety code compliance SHALL take precedence over immediate job production, with SAFETY ALWAYS FIRST.

(4) Every reasonable facility of our own and other organizations SHALL be used to carry out the policy of integrating safety into all work planning, training, inspection, and execution.

(5) Good safety performance SHALL be acknowledged by suitable recognition and awards, depending on the merits of each case.

(6) Responsibility SHALL be fixed for all preventable accidents, and discipline SHALL be administered if warranted.



1.11(7)

1.11 (7) The policies and principles in the Forest Service First Aid Guide SHALL be observed at all times.

(8) All Forest Service handbooks SHALL include specific safe practices for all their activities, which supplement the safety code.

(9) Wherever applicable, local, State, or nationally recognized safety codes or standards SHALL be used in Forest Service work.

(10) Safe working codes SHALL be developed before new projects are started, and new equipment, machines, and work methods are used. These codes SHALL be put into effect as soon as enforcement is practicable.

(11) Procurement officers SHALL obtain only equipment and material that is safe to use. Bids SHALL contain safety clauses where applicable.

1.12 REGIONAL FORESTERS AND DIRECTORS

(1) They SHALL be responsible for implementing the safety policy.

(2) They SHALL designate a Safety Officer to provide leadership, planning, and advisory service coordination, in all safety activities within their units.



(3) Sufficient funds SHALL be allocated to provide the necessary field and clerical assistance as well as promotional materials to assure an acceptable safety program.

(4) Projects SHALL be adequately financed so that jobs do not have to be highballed by poorly supervised, inadequate, unskilled employees or with unsafe materials.

(5) Where concentrations of employees or operational hazards exist, safety councils, committees, or other effective means SHALL be provided to--

- a. Advise and recommend on safety programs.
- b. Review injuries and recommend how to prevent recurrences.
- c. Stimulate interest in accident prevention.
- d. Assist in developing better job attitudes and safer work methods.

1.13 INSPECTORS

(1) All general and functional inspectors at all levels, including Chief's Office, SHALL be required, on their assigned activities, to--

a. Be familiar with the Forest Service Health and Safety Code and check for compliance with it. See responsibility check list 1.16.

b. Investigate the effectiveness of accident prevention measures, both for employees and for the general public.

c. Examine employee attitudes, working conditions, and practices to determine hazards.



1.13(1)d.

1.13 (1) d. Check on compliance with accident prevention clauses when included in contracts.

e. State, in inspection reports, ways to make jobs safer and to eliminate hazards to the public. Also give commendations for safety accomplishments.

1.14 SUPERVISORY OFFICERS

(1) A person who supervises the work of one or more individuals SHALL be responsible for taking every reasonable precaution to prevent injuries.

(2) Work supervisors SHALL consider employees' safety a basic part of their jobs and SHALL set the example in all safety activities.

(3) The principles of Planned Work Area Protection SHALL be applied to all jobs. These are:

a. Plan your work area, keep it small, and be alert to hazards on adjoining areas.

b. Warn and protect others, including the public, on or near the job.

c. Always use safety devices and equipment.

d. Place SHALL be left in safe condition for others.



(4) Forest officers in immediate charge SHALL issue and review the Health and Safety Code with foremen or superintendents when duties are assigned, and delegate responsibility for compliance. Remember that there is no job so important that it cannot be done safely.

(5) When assigning a job to a foreman or worker, the forest officer SHALL assist in cataloging the job hazards, emphasizing the killer risk or other serious risks involved.

(6) Each foreman and crew leader SHALL take a minimum of 5 minutes each day to discuss with his men a specific hazard of the day's job. When daily group discussion is not convenient, the foreman SHALL do it at least twice a week. For isolated workers such as guards, a pointed comment or question SHALL be included in ordinary radio or telephone conversations.

(7) Supervisory officers and overhead SHALL be responsible for making their projects injury-free. They SHALL--

a. Analyze the hazards and determine the safest way of doing the job. Individual and group training plans SHALL emphasize achieving knowledge and skills in the safety aspects of all activities.

b. Locate and remove unsafe conditions and practices before they cause an accident.

c. When in charge of new men, first check their experience by questions and demonstrations. Work SHALL not be started until you have given thorough on-the-job instruction, insisting on safe work methods and pointing out job hazards.

d. Continue instructions as necessary to maintain safe working habits of all workers.

e. Recommend transfer to other kinds of work, discharge, or demotion of workers who cannot or will not follow instructions.



1.14(7)f.

1.14 (7) f. Train personnel to identify and eliminate hazards, and to work safely, insisting upon safety-minded attitudes at all times.

g. Anticipate the unexpected and be prepared to meet it.



(8) Supervisory officers SHALL give serious attention to the physical condition of seasonal employees when they return to duty.

(9) Fire fighters SHALL be carefully screened.

(10) Employees SHALL be placed only in jobs to which they are suited physically and mentally. THOSE WHO REACT SLOWLY OR WHO LACK ALERTNESS SHOULD NOT BE USED ON HAZARDOUS JOBS.

(11) Supervisory officers SHALL appoint special safety officers on projects where numerous or unusual hazards exist, such as on fires.



1.15 INDIVIDUALS

(1) It SHALL be every employee's duty to protect himself and his fellow workers from accidents.

a. Maintain active participation in a continuing program for safe working conditions.

b. Watch for, immediately remove, or report all foreseeable hazards endangering employees or the public, whenever practicable.

c. Learn safe work methods to minimize hazards that cannot be removed.

d. Tactfully call to the attention of fellow workers any unsafe practices or conditions.

e. Study the Health and Safety Code, and ask your boss if you are not sure of safe procedures.

f. Be continually alert to avoid actions endangering the safety of anyone, including yourself.

1.16 DIVISIONS SHALL BE PRIMARILY RESPONSIBLE FOR CODE ENFORCEMENT AND FIELD CHECKS AS FOLLOWS:

- | | |
|-----------------------|----------------------------|
| (1) All Divisions | 1.1 Policy |
| | 4.3 Off The Job |
| | 7.1 Hand Tools Incl. Power |
| (2) Engineering | 2.1 Car Travel |
| | 5.4 Roads and Trails |
| | 5.7 Wood Preserving |
| | 6.1 Blasting |
| | 6.3 Concrete and Masonry |
| | 6.4 Excavation |
| | 6.5 Ladders and Scaffolds |
| | 6.6 Rigging |
| | 6.7 Welding |
| | 7.2 Machine Equipment |
| | 7.3 Safety Equipment |
| | 8.1 Color Code |
| | 8.5 Repair Shops |
| | 8.7 Wood and Metal Shops |
| | 9.3 Sanitation |
| (3) Operation | 1.2 Contracts |
| | 3.2 Building Protection |
| | 3.3 Flammables |
| | 5.8 Radioactive Work |
| | 6.2 Radio and Telephone |
| | 8.2 Electricity |
| | 8.6 Warehousing |
| (4) Timber Management | 2.3 Foot Travel |
| | 5.2 Forest Project Work |



- | | |
|-----------------------------------|--------------------------------|
| 1. 16(4) Timber Management--Cont. | 5.3 Sales and Scaling |
| | 5.5 Cruising and Surveying |
| | 8.3 Laboratories and Chemicals |
| (5) Fire Control | 2.2 Air Travel |
| | 3.1 Fire Fighting |
| | 3.4 Lightning |
| (6) Recreation and Lands | 2.5 Water Travel |
| | 4.1 Public - General |
| | 4.2 Recreation |
| (7) Range Management | 2.4 Animal Travel |
| | 5.6 Fencing |
| (8) Wildlife Management | 5.1 Firearms |
| (9) Fiscal Control | 8.4 Offices and Dwellings |
| (10) Personnel Management | 1.3 Accident Investigation |
| | 9.1 Health Policy |
| | 9.2 Disease Control |

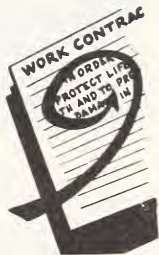




1.2 CONTRACTS

1.21 DEVELOPMENT, INSPECTION, AND ENFORCEMENT

(1) The special accident prevention knowledge and skill of regional, station, and unit safety officers SHALL be fully utilized in developing practical contracts and enforcing them.



(2) Forest officers SHALL be given instruction in the action they are to take in enforcing all accident clauses, including the right safety inspection methods, before agreements or contracts become effective.

(3) On large or emergency jobs consideration SHALL be given to employing full-time or part-time safety officers, to protect the Government and the contractor and their respective employees.

(4) We are not responsible for inspection to assure compliance with applicable provisions of Federal and State laws and regulations, such as those of State Industrial or Workmen's Compensation Commissions.

1.22 GENERAL CLAUSES

(1) A general accident prevention clause SHALL be included in all hazardous work contracts, except for road construction but including memoranda of



1.22(1)

verbal agreement, worded as follows: "In order to protect life and health and to prevent damage in the performance of this contract, the contractor or any of his subcontractors will use due diligence in preventing accidents and shall comply with applicable provisions of Federal and State laws and regulations. The contractor's record of all cases of death, injury, or disease arising out of, or in the course of, employment on work under this contract shall be available upon the call of the contracting officer or his representative."



(2) Duplicate accident records SHALL not be necessary if reporting is already a State requirement.

(3) For road construction contract safety clauses, see Forest Service Manual, Contracting, Section 7, General Requirements-Road Construction Contracting.

1.23 SPECIAL CLAUSES

(1) ALL HAZARDOUS WORK CONTRACTS SHALL CONTAIN SPECIAL SAFETY CLAUSES TAILOR MADE TO FIT LOCAL CONDITIONS, IN ORDER TO ADEQUATELY PROTECT OUR PERSONNEL AND THOSE OF THE CONTRACTOR.

(2) Suggested sources are the Forest Service Health and Safety Code, the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc., U. S. Engineers' Safety Requirements, and Air Operations Handbook.

(3) Prior to signing the contract, the contractor and forest officer SHALL arrive at a mutual understanding on eliminating or curtailing hazardous conditions and practices to prevent injury to people and damage to property. This understanding SHALL be made a part of the contract.







1.3 ACCIDENT INVESTIGATION

1.31 NECESSITY FOR REPORTS

- (1) To find basic causes of accidents.
- (2) To determine responsibility and liability.
- (3) To provide facts for a comprehensive accident prevention program.

1.32 DEFINITIONS

(1) A chargeable injury SHALL be one that has been approved by the Bureau of Employees' Compensation. Questionable cases SHALL be charged, pending BEC decision. Cases recurring from previous non-Forest Service injuries, SHALL not be chargeable to our record.

(2) A reportable accident is an unexpected occurrence involving operations, equipment, or employees while on official duty, and causing or resulting in injury to employees necessitating treatment by a doctor, or any injury to private citizens, or in damage to Government property in excess of \$25, or private property in any amount.

a. Disabling Injury:

1. A Serious Injury is one that causes death or might result in death (fractured skull, broken back, internal injuries).

(a) A Death is any injury or occupational illness resulting in death, regardless of time interval between the initial cause and death.



1.32(2)a. 1.(b)

1.32 (2) a. 1. (b) A Permanent Impairment is an injury or occupational illness which permanently and totally prevents one from working; or which results in a permanent partial disability, one resulting in loss of a member or part of a member; or permanent impairment to any part of body in any degree less than permanent total.

(c) A Permanent Total Disability is any injury or occupational illness that permanently and totally incapacitates the injured worker from following any gainful employment.

2. A Temporary Total, Disabling, or Lost Time Injury is one causing injuries that prevent the injured person from performing his normal occupation on any part of a day or shift following that on which the injury occurred, or on any day or shift following, whether or not absence was covered by authorized leave. If the day following injury is a non-workday, the injury SHALL be counted as disabling, provided the employee could not have worked on that day because of his injury. If injury does not prevent the worker from working, but he elects to take leave, it is not disabling. Lost time is only that lost due to the injury and not that due to travel time in securing medical care and return to duty. Lost time man-hours include weekends and holidays, but not the day of injury.

b. Non-Disabling Injury:

1. A Temporary Partial or Minor Injury prevents a worker from performing his own job, but does not prevent him from performing another regularly established job. This type and First Aid Medical Expense cases involve no lost time but are to be reported monthly on AD-135.

c. Property Damage Accident:

1. A Property Damage Accident is one in which there is damage to Government property (in-

cluding motor vehicles) in the amount of \$25 or more or damage to private property in any amount.

2. A Substantial Property Damage Accident is one in which damage is \$500 or more to the Government.

3. A Motor Vehicle Accident is one involving a motor vehicle that results in death, injury, or more than \$25 in property damage, or damage to private property in any amount, regardless of who is at fault, except when the vehicle is properly parked. The term motor vehicle includes Government-owned or rented trucks, passenger cars, motorcycles, and employee-owned vehicles used on official business.

1.33 INVESTIGATIONS

(1) Every disabling injury and property damage accident SHALL be investigated immediately.

(2) A coroner's inquest and an autopsy if desirable SHALL be requested for all accidental deaths on the job. If a special autopsy is requested by the Bureau of Employees' Compensation, the investigating officer SHALL obtain approval from the responsible dependent legally entitled to the remains.

1.34 INVESTIGATING OFFICERS

(1) The investigating officer SHALL be designated by the ranking administrative officer on the unit. All serious injuries or deaths SHALL be investigated by the Regional Forester, Director, or a delegated officer, together with an investigator from the unit involved. A representative from the Chief's Office SHALL investigate accidents where 5 or more deaths occur.



1. 34(2)

1.34 (2) The investigating officer SHALL be well qualified to make an immediate, thorough, fair, and unbiased investigation and report, protecting not only the Government's interests but also those of private parties. He SHALL not permit his loyalty to the Forest Service or its employees to influence him in determining and recording the facts on his recommendations concerning the accident. He SHALL be of equal or higher rank than the person being investigated.

1.35 INVESTIGATING PROCEDURES

(1) The scene of the accident SHALL remain as undisturbed as possible until investigated. The first step is a personal visit by the investigating officer to the scene as soon as possible after the accident.

(2) In the case of serious injuries, if the Regional or Chief's Office investigator cannot arrive as soon as the unit investigator, the latter SHALL proceed with the investigation.

(3) The investigators SHALL determine the cause, fix the responsibility, and recommend steps to prevent similar accidents.

(4) In cases involving serious injury or substantial property damage, photographs should be taken, and a rough sketch map of the site should be prepared, showing such items as topography, location of people and equipment before and after the accident, point of impact if any, compass points, direction of travel, and road, trail, ground, and weather conditions.

(5) The investigating officer SHALL interview, and obtain witness statements. He should not suggest or encourage the filing of claims. Witnesses SHALL

POLICY AND ADMIN.

ACCID. INVESTIGATION

be interviewed separately. They may be given assistance in preparing statements, using their own words.

(6) A statement should be gotten from the attending physician if any, covering a description of the injuries and a prognosis of each injured person, whether disability is likely to be temporary or permanent, probable time required for recovery, and degree of permanent disability if any.

(7) The following persons should participate in serious injury investigations:

- a. The investigating officer.
- b. The supervisory officer in immediate charge of the project or local administrative unit.
- c. The persons responsible for the accident.
- d. The responsible mechanical engineer, if construction or mechanical equipment is involved.

1.36 THE REPORT

(1) The investigating officer SHALL bear in mind that reviewing officers have only the report upon which to base their recommendations and final adjustments. All conflicting evidence should be resolved. The report forms the basis upon which administrators SHALL act in regard to--

- a. Accident prevention.
- b. Disciplinary action if any, to be taken against any negligent employee.
- c. Adjustment of claims.
- d. Property accountability.
- e. Facts and recommendations covering other administrative questions arising from the accident.



1.36(2)

1.36 (2) The report SHALL contain clear, concise statements of where, when, how, and why the accident occurred. Cross references should be made to attached witness statements, pictures, and sketches. It SHALL also include statements on--

- a. Both the direct and indirect causes of the accident.
- b. Conformance with the Health and Safety Code and with State laws on the part of those involved.
- c. Supervision and inspection in effect prior to and at the time of the accident.
- d. The human element--mental-physical condition of those persons involved, contributing acts or omissions, judgment, safety attitudes, and training.
- e. Detailed information on all physical factors and working conditions having a bearing on the accident, such as weather, visibility, vegetative cover, and road or ground conditions.
- f. Previous accident records of participants and other information such as age, health, sobriety, working or driving experience, and general safety habits.
- g. Whether private parties are covered by insurance, particularly in vehicular accidents; if insured, the name and address of insurer and extent of coverage should be given. Determine also whether the Government driver is covered by property damage and liability insurance. If so, he should file notice of the accident with his insurer, and attach a copy of such notice to his SF 91, Operator's Report of Motor Vehicle Accident.
- h. Findings of coroner's inquest in cases of deaths on the job.

(3) The term "unavoidable" SHALL be used only when an accident is caused by occurrences entirely unrelated to the activity, such as a landslide, light-

POLICY AND ADMIN.

ACCID. INVESTIGATION

ning, or through actions by a nonemployee over whom we have no control. The fact that somebody fails to use proper care, judgment, or prudence until too late to avoid an accident does not make the accident an unavoidable one; at some point it becomes impossible to prevent any accident. The investigation is intended to develop the circumstances prior to the unavoidable stage.

(4) For serious injuries the investigating officer SHALL prepare the report in quadruplicate (one for the unit, two for the regional office or station, and one for Washington Office).

(5) Fiscal procedures for handling personal property damage, and personal injuries are covered in the Forest Service Manual, Vol. II, Sections N and O.

1.37 REVIEWING OFFICERS

(1) Officials reviewing the Investigating Officer's Report SHALL include their recommendations in the letter of transmittal to the regional office, station, or Washington Office.

1.38 GENERAL

(1) In case a foreign national is killed or seriously injured, immediate notification SHALL be given to the victim's nearest consulate or embassy, other United States agencies such as United States Employment Service, or local civil authorities such as sheriffs.

(2) Wherever possible, a responsible forest officer SHALL stay with the victim, at least until he has adequate hospital care.





CHAPTER 2

TRAVEL

LEGEND

CAPITALIZED TEXT--somebody was killed by not observing these practices.

SHALL--denotes a mandatory requirement.
The SHALL's are capitalized for easy reference.

SHOULD--denotes a recommended practice.

It is the duty of each of us
to prevent accidents - and to
protect himself and others
from injury



CHAPTER 2. TRAVEL

CONTENTS

SUBJECT	Page
2.1 <u>CAR</u>	
General - For All Drivers	25
Defensive Driving.....	25
Truck Driving.....	28
Emergency Driving	30
Trailers.....	30
Railroad Speeders	31
2.2 <u>AIR</u>	
General.....	33
Personnel	34
Flying Practices.....	34
Equipment	35
Parachutes	37
Cargo Dropping	38
Smokejumping.....	40
Helicopters	40
2.3 <u>FOOT</u>	
General	43
Winter Travel.....	44
Emergencies.....	45
Poison Plants, Insects, & Snakes	46
2.4 <u>ANIMAL</u>	
Selecting Stock	51
Assigning Stock	51
Handling Stock	52
Riding a Horse	53
Packing.....	55
Working with Other Animals ...	56
Animal Hauling.....	56
Shoeing.....	58
2.5 <u>WATER</u>	
General	59
Personal Protection	59
Emergency Procedures.....	60
Manually Operated Watercraft .	61
Power Vessels 20 Feet and Over	63
Scows	66
Wanigans	67
Ice Safety.....	67



2.1 CAR TRAVEL

2.11 GENERAL--FOR ALL DRIVERS

(1) MOTOR VEHICLES ARE ONE OF OUR GREATEST KILLERS. ALL DRIVERS SHALL ADOPT A POLICY OF DEFENSIVE DRIVING. THIS MEANS--



a. DRIVING SO AS TO AVOID ACCIDENT SITUATIONS CREATED BY THE MISTAKES OF OTHERS OR BY WEATHER AND ROAD CONDITIONS.

b. YIELDING THE RIGHT-OF-WAY EVEN WHEN, BY ALL RULES OF THE ROAD, IT IS ACTUALLY YOURS.

c. MAKING AN UNBROKEN SERIES OF CONCESSIONS TO OTHER DRIVERS WHO ARE THOUGHTLESS, UNSKILLED, OR IGNORANT OF THE HAZARDS THEY CREATE.

(2) VEHICLES, OWNED OR LEASED BY THE FOREST SERVICE, SHALL BE DRIVEN ONLY BY PHYSICALLY FIT EMPLOYEES WHO HAVE QUALIFIED FOR AND WHO HOLD BOTH STATE AND GOVERNMENT OPERATOR'S PERMITS AND WHO SHALL BE THOROUGHLY FAMILIAR WITH THIS CAR SECTION OF THE SAFETY CODE.



2.11(3)

2.11 (3) Any driver SHALL be grounded if he is habitually careless, repeatedly uses poor judgment at the wheel, or willfully violates driving regulations.

(4) A driver whose known deficiencies make his driving unsafe SHALL be grounded until deficiencies are remedied, or his driving SHALL be restricted to compensate for limiting factors.

(5) ALL DRIVERS SHALL PULL OFF THE ROAD FOR A SHORT REST, COFFEE BREAK, OR CHANGE OF DRIVERS IF THEY GET DROWSY AT THE WHEEL DUE TO LACK OF SLEEP, LONG TRIP, MOTOR DRONE, STRAIGHTAWAYS, ETC.

(6) Before driving any assigned vehicle, the driver SHALL thoroughly check for adequate brakes, steering, windshield wipers, tires, lights, and horn.

(7) While operating the vehicle, the driver should have no additional duties, such as reading a map or scouting the countryside.

(8) Every Forest Service vehicle should be equipped with seat belts, warning flags or flares, and a first aid kit.

(9) All State and local traffic regulations SHALL be observed.



(10) DRIVER SHALL DRIVE AT A SPEED THAT PERMITS FULL CONTROL OF THE CAR, ALLOWING FOR ALL FACTORS SUCH AS ROAD, WEATHER, AND TRAFFIC CONDITIONS.



(11) ON CURVES, THE DRIVER SHALL BE ABLE TO STOP VEHICLE WITHIN LESS THAN HALF OF THE VISIBLE DISTANCE.

(12) When starting to go downgrade, the driver SHALL shift vehicle into lower gear.

(13) Chains or mud, snow, or tractionized tire treads SHALL be used for hazardous road conditions when necessary.

(14) When running the motor to provide heat in cold weather, a window SHALL be open.

(15) Drivers SHALL not transport loose articles on shelf behind seat where rear vision will be obscured, or if there is danger of articles being thrown forward when car stops suddenly.

(16) Drivers SHALL--

a. Make certain the way is clear before backing or maneuvering. They SHALL be directed by qualified signalmen, if available.

b. Avoid overloading the front seat. Unless there is plenty of room to manipulate controls, no more than two persons SHALL occupy the front seat.



2.11(16)c.

2.11 (16) c. STOP AT ALL RAILROAD CROSSINGS WHERE CLEAR VIEW OF RIGHT-OF-WAY IS RESTRICTED TO LESS THAN 500 FEET IN EACH DIRECTION OR WHERE TRAIN IS APPROACHING WITHIN THAT DISTANCE. EXCEPTION: WHERE A RAILROAD WATCHMAN OR AUTOMATIC GATE OR SIGNAL SERVICE IS PROVIDED.



d. When traveling in convoy, keep at least 200 feet apart, or farther if required by State law.

(17) Vehicle wheels SHALL be blocked where there is any danger of vehicle rolling, such as when jacked up, or when parked on a hill without curbs or banks.



2.12 TRUCK DRIVING

(1) Every truck and pickup regularly used for transporting persons SHALL have--

a. SUFFICIENTLY HIGH AND STRONG GUARDRAILS TO PREVENT FALLS.

b. Seats anchored to the vehicle bed.

c. Substantial steps or endgates for loading and unloading. Rear bumper can serve as step on pickups.



(2) Men and tools or supplies SHALL be hauled together only when--

a. Tools are enclosed in substantial toolbox attached to the bed and equipped with securely fastened cover.

TRAVEL

CAR

- b. In emergency, tools are wrapped in canvas or other material and lashed to the truck.
- c. Supplies are securely lashed to the truck.

(3) IN NO CASE SHALL PASSENGERS RIDE ON TOP OF A LOAD OF SUPPLIES.

(4) No passengers SHALL be carried in the body of a truck carrying explosives or toxic or flammable substances, except that gasoline in safety cans may be carried with passengers.

(5) The driver or foreman in charge SHALL be sure all persons are seated and endgates SHALL be in place before vehicle starts.

(6) Passengers SHALL ride only in cab or body of motor vehicles. This means--

- a. Arms or legs inside of racks or ends of truck body.
- b. Everybody seated while vehicle is in motion.
- c. No riding on hood, fender, or running board.



(7) Dump-truck drivers SHALL--

- a. Be sure the hoist control mechanism cannot be accidentally engaged, when hauling men and supplies.
- b. Always get out of truck when it is being loaded.

(8) Only dump-truck drivers or dump bosses SHALL trip the tailgate, and then only after the truck has been brought to a full stop.



TRAVEL

CAR

2.13

2.13 EMERGENCY DRIVING

(1) SHIFTS SHOULD NEVER EXCEED 12 HOURS.

(2) Following the first 24 hours, truck drivers should operate under the 8-hour day.

(3) Each duty shift SHALL be followed by off-duty rest period adequate to relieve fatigue.

(4) Whenever men are being hauled at night, or under other conditions of poor visibility, a relief driver or alert overhead SHALL ride in the cab with the driver.

(5) Passengers may be transported in vehicles without seats or guardrails, provided they are required to sit on the floor. If such use continues, seats and guardrails SHALL be provided as soon as possible.

(6) All vehicles going to fires SHALL abide by traffic lights and stop signs unless escorted by police.

(7) Vehicles parked on highways at fires SHALL be marked by flags or flares to warn motorists of presence of equipment and workers.

2.14 TRAILERS

(1) When any motor vehicle is used to tow a trailer, its brakes and the brakes of the trailer SHALL be able to stop the loaded trailer within maximum distances specified by State law.



TRAVEL

CAR

(2) When used in night operations, trailers SHALL be equipped with standard taillights and stoplights that function properly.

(3) Horse and similar trailers SHALL be equipped with trailer jacks or landing gear.

(4) A safety chain SHALL be used in addition to trailer coupling or tow bar.

(5) Something other than the hand SHALL be used to steer the coupling device into position for locking.

2.15 RAILROAD SPEEDERS

(1) Forest Service employees riding on or operating railroad speeders SHALL know and comply with applicable safety regulations of the railroad.







2.2 AIR TRAVEL

2.21 GENERAL

(1) The Air Operations Handbook and Civil Air Regulations SHALL be enforced in all Forest Service air operations unless deviations are authorized by the Chief or the Civil Aeronautics Administration, or unless the operations are conducted by the Armed Forces under military air regulations.

(2) THE PILOT IN COMMAND SHALL BE RESPONSIBLE FOR THE SAFETY OF THE AIRCRAFT, OCCUPANTS, AND CARGO. HE HAS COMPLETE AUTHORITY TO POSTPONE, CHANGE, OR CANCEL HIS FLIGHT WHEN HE BELIEVES EXISTING OR IMPENDING CONDITIONS MAKE IT UNSAFE.

(3) The responsible Forest Officer SHALL cancel or terminate operations when, in his opinion, conditions make air operations unusually hazardous or when the pilot does not adhere to essential precautionary measures.

(4) Forest Service personnel may make official flights with cooperators in business or public aircraft when mutually advantageous. The aircraft being used and the flight should conform to the Health and Safety Code and to all safety requirements applicable to similar flying in charter aircraft.

(5) Flight plans for all missions SHALL be filed so that overdue aircraft will be checked up on as soon as possible.



2.21(6)

2.21 (6) Aircraft occupants SHALL use only safety matches or mechanical lighters. Only safety matches in tight metal containers and mechanical lighters SHALL be carried in smokejumper packs, paracargo, and airfreight.

(7) Cigarette and cigar smoking may be permitted if plane is equipped with ashtrays, but never during refueling, takeoffs, landings, or at other times specified by the pilot.



(8) All cargo and airfreight SHALL be securely fastened in place.

(9) Experimenting, research, and development in air operations SHALL be limited to work approved and assigned by the Chief.

2.22 PERSONNEL

(1) Each Region, Station, and W.O. unit and subordinate unit having under its jurisdiction use of aircraft SHALL designate an air operations officer who SHALL check on conformance with the instructions in the Health and Safety Code, the Air Operations Handbook, and Civil Air Regulations.

(2) Qualification of all pilots, as well as employees not employed primarily as pilots, but who occasionally pilot aircraft on official work or travel, SHALL comply with the Air Operations Handbook.

2.23 FLYING PRACTICES

(1) Before engaging in local flights, pilots SHALL familiarize themselves with the operating area and with important hazards to flying conditions peculiar

TRAVEL

AIR

to the area. This SHALL include traffic and hazards as well as peculiarities of airfields or water landing areas to be used as terminals.

(2) In the air, the pilot SHALL--

a. Reach a safe altitude above the airfield or water landing area before leaving the vicinity, unless the mission, nature of surrounding terrain, or local air traffic rules make this impractical.

b. On all flights in single-engine aircraft, follow as far as practical, routes over open valleys, highways, plateaus, waterways, or other terrain offering best opportunity for safe emergency landings.

c. Except when landing or taking off, or in such operations as dropping cargo or applying materials when low flight is essential and specifically authorized, always fly fixed-wing aircraft at least 500 feet from obstacles, domestic animals, persons, vehicles, or boats. Avoid congested areas.

d. When flying up drainage, always know topography ahead and maintain sufficient altitude plus wide margin of safety and flight course to permit safe turning or flying over sides or head of drainage.

e. Avoid blind or instrument flight in single-engine aircraft, except for pilot training or practice, for short periods in passing through overcast where location of all obstacles is known, or for urgent emergencies.

f. In all mountain flying, provide an extra wide margin of safety. Carry light loads to give high performance and a reserve of power.

2.24 EQUIPMENT

(1) Aircraft SHALL be maintained in accordance with instructions or recommendations of the aircraft



2.24(1)

and engine manufacturers or other instructions approved by CAA.

(2) All single-engine aircraft should have approved shoulder harness for front seats. Such harness SHALL be provided in all fixed-wing aircraft used in spraying and other missions requiring prolonged low-level flight. Shoulder harness SHALL be worn during takeoff or landing, when flying within 1000 feet of the ground and at other times specified by the pilot or other responsible person.

(3) All aircraft SHALL have CAA-approved seats and seat belts for all occupants except when special requirements of use or mission make this impractical. Exception for each special requirement SHALL be approved by the Regional Forester, Director, or W.O. Division Chief responsible. Every other means SHALL be taken to provide maximum protection for the occupants during landing, takeoff, and flight in rough air. All occupants SHALL use seats and seat belts during takeoff, landing, rough air, and such times specified by the pilot or other responsible person.

(4) In addition to equipment required by Civil Air Regulations and the Air Operations Handbook, all fixed-wing aircraft SHALL carry the following:

a. Land planes:

1. Parachutes when required (see 2.25).
2. Copy of air-ground visual signal code.
3. First aid kit.
4. Emergency rations (optional for accessible areas).
5. Flashlight.

b. Seaplanes SHALL carry a life preserver for each occupant, an anchor, and a canoe paddle, in addition to items 2.24(4)a1-5 above.

(5) Stall warning indicators SHALL be provided on all fixed-wing airplanes excepting light planes used only occasionally and limited to daylight operations and to high-level flight with normal maneuvers.

2.25 PARACHUTES

(1) Before takeoff, everybody required or electing to wear parachutes SHALL be instructed in adjusting, wearing, and using them, and in bailout procedures. Wherever practicable, chutes SHALL be made available to persons electing to wear them.

(2) Parachutes or parachute harness with pack immediately available SHALL be worn as follows:

a. By all plane occupants where pilot determines he cannot make a forced landing with reasonable chance of survival over most of the planned flight route.

b. All plane occupants except the pilot and cargo dropper SHALL wear them when dropping cargo or smokejumpers.

(3) Wearing parachutes SHALL be optional--

a. Where pilot determines he can make a forced landing with reasonable chance of survival over most of the planned flight route.

b. When continuous flights are required at less than 1,000 feet above the treetops, such as on spray and survey jobs.

c. For pilot and cargo dropper when dropping cargo or smokejumpers.

(4) Parachutes SHALL not be required--

a. In multi-engine ships when maintained and operated at safety standards equal to air carriers.

b. When the pilot determines the weight of the parachute or harness with pack will seriously increase the hazard of an emergency flight.



2.25(4)c

2.25 (4) c. On occasional emergency flights when they cannot practicably be made available in advance.

2.26 CARGO DROPPING

(1) Cargo-dropping missions SHALL be coordinated with other air traffic in the vicinity of the drop target.

(2) A heavy strap or suitable bar SHALL be kept in place across doorway used for cargo dropping except when its removal is necessary in discharging cargo.



(3) A large sharp knife or other suitable emergency quick release device SHALL be provided at the cargo discharge port to permit cutting away fouled parachutes.

(4) Cargo SHALL be dropped only from planes approved for cargo dropping by air operations officers designated by the Regional Forester or Station Director.

(5) Cargo SHALL be dropped in accordance with the Air Operations Handbook and supplemental instructions issued by the Regional Forester or Station Director.

(6) Cargo SHALL not be dropped from aircraft manned only by a pilot unless such aircraft is equipped with an approved remote-control cargo-releasing device.

(7) Pilots and crew including dropper SHALL be fully qualified and trained. See Air Operations Handbook.

(8) The pilot and cargo dropper SHALL make certain the target area is clear of personnel, animals, and vehicles before starting cargo-dropping runs.

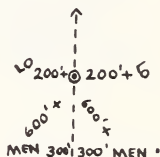
(9) During dropping operations, cargo dropper SHALL--

- a. Wear snug fitting clothes free from openings or loops that might catch on paracargo.
- b. Wear shoes with nonskid soles.
- c. Wear approved cargo-droppers' harness unless cargo opening is less than 10 by 14 inches.
- d. Inspect all cargo for loose, faulty, or weak packaging.

(10) Officer in charge of ground operations SHALL--

- a. Be trained in cargo-dropping techniques.
- b. Select, subject to pilot's approval, cargo-dropping target, keeping in mind wind drift of cargo, low altitude flight precautions, and approach and getaway free from obstructions, excessive air turbulence, smoke, and clouds.

c. Take necessary action to clear the target danger zone of any persons, animals, and vehicles, prior to arrival of the airplane. The danger zone SHALL be the area within a rectangular strip approximately 200 feet wide, running along each side of the flight path of the plane as it passes over the target. Each strip SHALL extend from target approximately 300 feet in the direction from which the plane approaches the target and 1,300 feet or more in the direction the plane leaves the target. The camp SHALL be 600 feet from the target and outside of the danger zone.



2.26(10)d.

2.26 (10) d. Arrange for alert, active lookouts to observe where cargo is landing and to keep danger zone clear of people until the entire load has been dropped and the plane has left the target area.

e. Keep personnel in vicinity of drop target from bunching up, away from dead or defective trees or snags that cargo might strike and break out limb or top, and preferably in open. Logs, brush, or steep hillsides which interfere with dodging dropped cargo should be avoided.

2.27 SMOKEJUMPING. SEE Air Operations Handbook, Part 2.

2.28 HELICOPTERS

(1) Before mission, pilot SHALL be briefed on other air traffic, terrain, and location of surface hazards, such as box canyons, radio towers, power cables, and telephone lines.

(2) When possible, routes permitting autorotative landing at any time SHALL be selected.

(3) Helicopter pilots should have at least 1 hour's rest in each 4 hours of flight duty and at least 12 hours' rest per 24-hour day.

(4) All personnel working on or near a helicopter project SHALL observe these safety requirements:

a. Stay away from helicopter when rotor blades are in motion, unless authorized by the pilot or other authority. This means stay at least 50 feet away.



TRAVEL

AIR

b. When nearer than 50 feet, approach or leave from front or from side near front, where the pilot can always see you.

c. Never approach or leave ship from any side where ground is higher than ground where ship is standing or hovering.

d. Unless equipped with safety goggles or glasses, do not watch landings, takeoffs, or hovering, closer than 100 feet from the helicopter.

e. Safety belt SHALL be fastened at all times except when instructed by the pilot to release it.

f. Do not stand up in open cockpit models.

g. When leaving the ship, walk immediately away, to the front or side toward the front until you are at least 50 feet from the rotors.

h. Stay away from tail rotor at all times, and see that others do likewise.







2.3 FOOT TRAVEL

2.31 GENERAL

(1) Clothing and nonskid boots SHALL be suited to the country, climate, and job. Trousers should be cuffless for all field work.

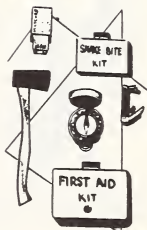
(2) EMPLOYEES SHALL AVOID TRAVELING OR WORKING ALONE IN ISOLATED AREAS INsofar AS PRACTICABLE, ESPECIALLY UNDER HAZARDOUS CONDITIONS.

(3) If it is necessary for a person to travel or work alone, he SHALL leave an itinerary of his planned trip with his immediate superior or some other responsible employee, and his family.

a. This itinerary SHALL indicate where he is going, the planned route of travel, and the approximate day and hour he will return.

b. If he fails to return on schedule, a search SHALL be started within a reasonable period.

(4) When traveling in back country, first aid and snakebite kits, compass, matches, and a pocketknife or belt ax, also flashlight at night, should be carried.



2.31(5)

(5) Workers SHALL--

a. Choose safe travel routes and stream crossings.

b. Avoid traveling or camping in snag areas in windy weather.

c. MAKE SURE OF SECURE FOOTING AND SAFE WORKING POSITIONS.

d. Always be on guard against injury from falling trees, snags, limbs, rolling logs, or rocks. If you hear a rolling rock, log, or tree, don't run blindly. Determine its falling direction, then get out of its path.

e. Be sure other workers know where you are working.

f. Guard against twigs and branches striking your eyes.

g. Watch your step! Rocky slopes, especially slide rock and steep country, are treacherous. Have one hand free to protect yourself against falls or obstructions.



(6) See 5.5 Cruising and Surveying.

2.32 WINTER TRAVEL

(1) All forest officers who have on-the-ground planning, administrative, or supervisory responsibilities, calling for field work in mountainous snow areas, SHALL have training in winter mountaineering, avalanche hazard recognition, and, where there is a distinct need, training in avalanche control.

(2) When traveling in the winter in snowslide areas, employees SHALL--

a. AVOID IF POSSIBLE TRAVELING IN HAZARDOUS AREAS. IN THE SPRING, SNOWSLIDE

TRAVEL

FOOT

HAZARDS ARE EXTREME AFTER 3 OR MORE DAYS OF UNUSUALLY HOT WEATHER.

b. Stay out of snow country for 48 hours after heavy snowstorms or until the new snow bonds with the old.

c. In the spring or during periods of heavy thawing, arrange to travel over snow areas during the early morning hours, because wet snow avalanche hazard increases greatly after 12 noon.



(3) In deep snow and cold weather, travelers should get an early morning start, and make camp early, preferably by 3 p.m., before they get tired.

(4) When traveling on ice, especially shore ice, use a pole to prospect ahead of you; if ice breaks, you can use pole to help you get out of the water.



2.33 EMERGENCIES

(1) If you get lost, keep calm. Don't walk aimlessly. Trust your map and compass. Shelter and warmth are much more important than food.

a. Climb to where you can see surrounding country, to orient yourself.

b. Select a sheltered spot and prepare camp, shelter, and firewood before dark.

c. When you reach a road, trail, or telephone line, follow it. As a last resort, follow a stream downhill.



2.33(1)d.

2.33 (1) d. After unsuccessful attempts to find your way, stay in one place, conserve your strength, and build a fire so that smoke can be seen by searchers.

(2) If you are injured and alone, keep calm. Stay where you are, and build a signal fire of green boughs. Usually someone will find you.

2.34 POISON PLANTS, INSECTS, AND SNAKES. See First Aid Guide, pp. 12-17.

(1) Ivy, Oak, and Sumac:

a. All employees subject to exposure to these hazards SHALL be instructed in plant identification.

b. Highly sensitive persons should not be exposed.

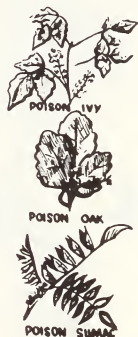
c. When working in affected areas, employees SHALL--

1. Fasten trouser legs closely over boot tops, or tuck them in.

2. Wear gloves, and keep them away from face or exposed parts of the body.

3. After work, wash exposed parts thoroughly with thick soapsuds (yellow laundry soap is best) in hottest possible water, then alcohol.

4. Clean tools with cleaning solvent before putting them away.



5. Wash exposed clothing in thick, hot suds separately from other clothes.

d. Poisonous plants SHALL be destroyed around improvements where practicable.

1. Use Ammate, 2,4-D, 2,4,5-T, or 2,4,5 to kill plants.

2. Burn only in isolated areas.

3. Avoid contact with smoke; particularly avoid getting it in your eyes or inhaling it.

e. Immunization treatments by a doctor or application of body ointments or salves are recommended.

(2) Insects:

a. Employees exposed to dangerous infestations of Rocky Mountain spotted fever ticks SHALL--

1. Wear medium high boots, and fasten trousers over boot tops.

2. Avoid walking through low vegetation when possible.

3. INSPECT BODY AND CLOTHING TWICE A DAY WHEN THERE IS A POSSIBILITY OF EXPOSURE TO TICKS.

4. At night, place clothing where ticks cannot get in it; and arrange bed so ticks cannot crawl into it.

5. If tick is found attached to body, remove it, using care to prevent infection through skin abrasions or cuts on fingers.



2.34(2)a.5.a.

- 2.34 (2) a. 5. a. Use tweezers if available.
b. Be sure to remove head of tick.
c. Hold lighted cigarette

close to tick to make it release its hold.

6. Take the tick shots if
working in tick areas. Facilities should
be made available for employees to take
shots.

7. Brush seed ticks off
trousers with a switch.

8. Use repellents such as
Ticks Off to keep ticks from attaching
themselves.

9. See doctor immediately if in tick
country and you have fever symptoms: Chill, followed
by continued fever, severe headaches, pains in bones
and muscles, skin eruptions on third day.

- b. Employees exposed to chiggers should--

1. Avoid sitting on ground or on logs and
avoid low vegetation when practicable.

2. Apply powdered sulfur
to legs and hands; dissolve sulfur tab-
lets in mouth.

3. Bathe in hot, soapy
water.

4. Use insect repellents
such as dimethyl phthalate, indalone.

- c. In black widow spider
areas, employees should--

1. Wear work gloves.

2. Turn them inside out
after placing them on ground tempo-
rarily.

3. Inspect material before
handling.



TRAVEL

FOOT

4. Be careful in outdoor
toilets.

5. If any bite shows
rapid inflammation and pain, see
doctor.

(3) Snakes:

a. Employees SHALL--

1. WEAR HIGH BOOTS
IN POISON SNAKE COUNTRY.

2. Be careful, around
places obscured by foliage or other-
wise, when walking in rocky country
or climbing ledges.

3. Use a bar for moving
materials and timber that have been
stacked or piled in snake areas. Do
not put hands under any stored mate-
rial where snakes might be present.

4. Take care not to step
over logs. Step on them and look down
before stepping off.

5. If bitten, keep cool.
Don't run or get overheated.

6. Carry a snakebite kit in
snake infested areas.







2.4 ANIMAL TRAVEL

2.41 SELECTING STOCK

(1) Only animals known to have no dangerous habits SHALL be accepted.

(2) Every reasonable effort SHALL be made to discover dangerous habits of strange animals.

(3) Only experienced men SHALL break horses of dangerous habits.

(4) If dangerous habits cannot be corrected easily, the animals SHALL be removed from service.

(5) Stock rented or furnished by seasonal workers SHALL be gentle and properly broken.

(6) The Service SHALL not hire untrained or "spooky" animals that might injure those riding or working with them.

(7) Only thoroughly experienced persons SHALL be assigned the job of breaking and training saddle and pack stock.



2.42 ASSIGNING STOCK

(1) No animal known to be dangerous SHALL be assigned.



2.42(2)

2.42 (2) Only gentle, well-broken stock SHALL be assigned to inexperienced personnel.

(3) Inexperienced personnel SHALL be given adequate instructions before they are allowed to handle stock.

(4) Forest officers SHALL assign stock only to those who can handle them.

(5) Special instructions SHALL be issued on handling animals suspected or known to have annoying or tricky habits.

2.43 HANDLING STOCK

(1) Employees SHALL keep cool, move quietly, speak softly, and treat kindly but firmly, with confidence.

(2) Animal SHALL be spoken to when approached; avoid approaching from the rear, if possible.

(3) All animals SHALL be given especially careful handling after prolonged layoffs.

(4) An animal SHALL always be led around after saddling, before mounting or packing.

(5) A firm hold SHALL be kept on reins or lead rope; never wrap them around your hand.

(6) Too much gear and equipment SHALL not be carried on a saddle horse; avoid carrying tools and equipment in your hands.

ANIMAL LOG	
NAME:	AGE:
WEAKNESSES:	
INJURIES:	
HABITS:	



(7) Excess lead rope that may become entangled with hands or feet SHALL be avoided.

- (8) When tying a horse, employees SHALL--
- Avoid slack that might entangle horse or man.
 - Never tie to a barbed wire fence.
 - Always stay away from a position directly in front of a solidly tied animal.
 - Whenever possible, tie an animal to an object he cannot walk completely around.
 - Never neck-tie a horse with a slipknot.

(9) Stock SHALL be kept away from all types of loose wire.

(10) The services of a qualified veterinarian SHALL be secured if horse is ill or seriously injured.

(11) A sweaty horse SHALL not be fed or watered until he has cooled off.

(12) Ask an experienced stockman for advice.

2.44 RIDING A HORSE

(1) Western riding boots, field boots, or workshoes SHALL be worn. Avoid using a type of shoe that may hang in stirrup.



(2) Snug-fitting clothing SHALL be worn. Chaps should be worn in the brush.

- (3) When mounting, rider SHALL--
- Lead horse a short distance after cinching.



2.44(3)b.

2.44 (3) b. Check cinch again.

c. Head horse uphill, or preferably cross-wise of slope with left side uphill.

d. Take up slack in reins.

e. Before mounting, check stirrups for correct positions. Stand opposite and close to left shoulder, facing animal's rear; take mane or saddle horn in left hand, gripping reins firmly, near rein tight, off rein slack, so that twist of wrist can pull horse to you if he becomes unruly; turn near stirrup toward rider's left foot; grasp saddle horn with right hand and swing into saddle quickly but lightly. Avoid scratching horse with spurs or heels when mounting.

f. Insert only toe of boot into stirrup when mounting. Don't shove feet clear into stirrups. If you are wearing field boots, ride on balls of feet, not the insteps.



(4) When riding, rider SHALL--

a. Be alert to animal's movements and guide him firmly but gently. Test his reining habits. Don't hold a tight rein unless necessary to restrain his forward movements.

b. Never wrap or tie reins around the saddle horn.

c. NEVER RIDE HORSE WHEN LIGHTNING STORM IS NEARBY OR OVERHEAD. See 3.4 Lightning.

d. Swing off occasionally. Check position of blanket and saddle, tightness of cinch. Look for worn or broken straps, cinches, reins, and in brushy country for trash under blanket.

e. Always keep lead ropes free when leading stock from a saddle horse. Never tie the lead rope around the lead horse's saddle horn or wrap rope around hand.



f. In dismounting, partly remove left foot from stirrup before swinging off to prevent a hung foot.

g. Always get off and lead a horse across excessively rocky or very steep terrain and corduroy, or pole bridges, where a horse has poor footing.

h. Watch the slack in the lead rope to avoid animal's straddling or stepping over it, and to keep it from getting under the lead horse's tail.

i. Never run a horse on hard pavement, frozen ground, or uphill.

j. Never shoot firearms while on horseback.

2.45 PACKING

(1) All pack animals SHALL be treated as dangerous until they are proved harmless.

(2) Persons, particularly inexperienced horsemen, SHALL keep away from pack stock being loaded or unloaded, unless asked to help and instructed on how to do it.

(3) Animals SHALL be tied short to a solid post or hitching rack, with heads pulled slightly up.

(4) Pack ropes SHALL be coiled and hung on saddles until actual packing begins, and immediately after unloading.

(5) A pack string SHALL be tied together with rope so animals can break apart in case of accident.



2.45(6)

2.45 (6) The animal's back SHALL be clean, the saddle blanket smooth, the saddle tight and properly fitted, and the side packs balanced, before pack is put on.

2.46 WORKING WITH ANIMALS OTHER THAN SADDLE OR PACK STOCK

(1) Livestock SHALL be securely held in chutes or securely tied with ropes before they are eartagged, dehorned, vaccinated, and branded.

(2) Employees SHALL always be on guard when in a corral with livestock.

(3) Extreme care SHALL be exercised in the presence of bulls or stallions.

(4) Employees SHALL let livestock know they are around. Do not walk up to them unexpectedly.

(5) Rope attached to animal SHALL not be looped around the hand.

(6) When a horse or team is being used for skidding, they shall either be led by the bridle or SHALL be driven, with long reins that will permit the driver to stand to the rear of the horse and if possible to the rear or well to the side of the object being skidded.

2.47 ANIMAL HAULING

(1) At regular loading locations, a loading ramp with cleats to prevent slipping SHALL be constructed, level with bed of truck.



(2) Floor of truck or trailer SHALL be cleated or covered to insure firm footing, and inspected frequently for loose or rotten boards and protruding nails.

(3) Side boards or rack SHALL be substantial to discourage animals from breaking out or climbing over the sides.

(4) Animal's halter SHALL be used during hauling. Fasten head securely. Tie-down ropes, safety harnesses, and straps over horses' backs SHALL be used on all horses that have habit of jumping out of single trucks or trailers. Horse SHALL be untied before the tailgate is lowered.

(5) When tying animals, fingers SHALL be kept out of loops.

(6) Trailer SHALL be level, with tailgates resting evenly on ground before loading or unloading.

(7) Men SHALL stand to one side when raising or lowering tailgate.

(8) Windshield or goggles SHALL be provided for horses.

(9) Loose gear SHALL not be carried in truck or trailer with animals.



(10) Quick stops and starts SHALL be avoided.

(11) Worker SHALL not get into trailer ahead of horse; worker SHALL not ride horse into trailer for loading.



2.47(12)

2.47(12) Two animals SHALL be hauled in trailer only when there is a bar or partition between them.

(13) Trailer hitch and auxiliary safety tow chains SHALL be secure before starting.

(14) Driver SHALL learn to back an empty horse trailer, before attempting to back trailer with horse in it.

(15) Horse trailers SHALL be towed no faster than 40 MPH.

(16) Horse trailer designed to carry more than 1 horse SHALL be equipped with electric or air brakes.

(17) See also 2.14 Trailers.



2.48 SHOEING

(1) Shoeing SHALL be done by an experienced person. All employees who are required to use a horse should be given instructions on how to shoe horses.



(2) Horseshoers should wear leather chaps or leather apron, and hard-toed shoes.

(3) If horse is hard to shoe and can't be readily trained, he SHALL be replaced.

(4) Nails SHALL be bent over and cut off promptly after being properly seated.



2.5 WATER TRAVEL

2.51 GENERAL

(1) MEN WORKING OVER SWIFT OR DEEP WATER, OTHER THAN ON PLATFORMS, OR ON SCAFFOLDS EQUIPPED WITH GUARDRAILS, SHALL WEAR LIFEJACKETS OR LIFEBELTS, OR HAVE LIFELINES ATTACHED TO THEM.

(2) When swimming, the buddy system SHALL be used. Have another fellow with you at all times. Also

- a. Wait an hour after meals before swimming.
- b. Do not swim if overheated.
- c. Never dive into strange water.



(3) Clothing that can be removed easily SHALL be worn.

2.52 PERSONAL PROTECTION

(1) All boats SHALL be in first-class condition.

(2) BOATS SHALL BE MANNED BY EXPERIENCED BOATMEN.

(3) BOATS SHALL NEVER BE OVERLOADED. A SAFE MARGIN WELL BELOW THE DANGER POINT,



CONSIDERING WEATHER AND OTHER CONDITIONS,
SHALL ALWAYS BE MAINTAINED.

(4) Somebody in the boat party
SHALL be able to apply artificial
respiration.

(5) Men who are habitually sent
out in boats SHALL be able to swim.

(6) A LIFE PRESERVER FOR
EACH PERSON ON A BOAT SHALL
BE READILY ACCESSIBLE AT ALL
TIMES.



(7) Avoid traveling in skiffs on exposed water
and in heavy tidal currents.

(8) Never swim for a skiff anchored out of reach
at high tide.

(9) Travel between vessel and shore SHALL not
be attempted in rough seas.

(10) Never travel alone in a skiff on long journeys.

(11) The boat skipper SHALL be responsible for
safety practices on his vessel.

(12) Rubber boats or liferafts over 5 years old
SHALL be declared unserviceable.

2.53 EMERGENCY PROCEDURES

(1) Travel SHALL not be done during periods of
high winds and rough water, or if a storm threatens.
If caught in a storm, keep the bow to the sea and

TRAVEL

WATER

reduce speed; beware of broaching to; and lower the center of gravity for a canoe by kneeling on the bottom.

(2) If your boat capsizes and you cannot get a life preserver, discard your heavy outer clothing and shoes, if possible. Hang on to boat, oar, or anything else that is floating nearby until help comes. Don't get panicky.



(3) Do not attempt to swim to shore from an overturned craft. Hang onto the craft until it drifts or can be paddled to shore, or until help arrives.

2.54 MANUALLY OPERATED WATERCRAFT

(1) Unless watercraft and canoes are capable of floating when capsized, they SHALL be equipped with air tanks capable of floating the craft when full of water. A bailing can SHALL be carried.

(2) Training in boat and canoe handling SHALL be given new men in sufficient amount to insure that they can operate safely on their own, for planned projects demanding their use of small craft. They SHALL be trained in resuscitation. They should be able to swim.

(3) A lifejacket SHALL be worn while on the water in any small boat or canoe.

(4) The loading SHALL be balanced evenly between port and starboard, and fore and aft to the extent that the keel has a good bite in the water and the craft is well trimmed for safe handling. Cargo



SHALL be so loaded and secured that it will not shift when the craft is in motion. Where possible, always load and unload from the side rather than over an end. Do not tie so much cargo to the craft that it will fail to float if it capsizes.

(5) When possible, a canoe SHALL be entered or left from the side rather than the ends, and always step in the center of the craft. Steady yourself while moving in a canoe by placing one hand on each gunnel.

(6) Employees SHALL not stand up, change places, or make sudden moves in a boat or canoe. Go to shore if it is necessary to change places, repair motor, or change position of cargo.

(7) When using an anchor, it SHALL be attached to the bow of the craft and not to either side. Exercise care in releasing and raising the anchor.

(8) Interior bottoms of metal and plastic craft should be given a coat of skidproof paint.

(9) The bowman SHALL be the principal lookout for submerged hazards, of which there are a great many in our lakes and streams, that can damage or capsize watercraft or injure propellers. The passengers in midship positions should not move about in an attempt to participate in the lookout's job.

(10) A light SHALL be carried when traveling at night to show your position, to check obstructions, to assist in landing and takeoff, to read map and compass, etc.

(11) Passengers SHALL remain seated while boat is in motion. Skylarking in boats SHALL be strictly prohibited.

(12) Oars and oarlocks SHALL be in good condition. Oarlocks should be fastened to boat. Spare oars and oarlocks SHALL be carried on long trips.

2.55 POWER VESSELS UNDER 20 FEET

(1) Too large a motor SHALL not be put on a small boat.

(2) A fire extinguisher SHALL be carried on long trips in a boat with an outboard motor.

(3) If spare gasoline is carried, it SHALL be in a safety can.

(4) An engine SHALL be refueled only when it is not operating.

(5) Only experienced persons should make surf landings, except in emergencies.

2.56 POWER VESSELS 20 FEET AND OVER

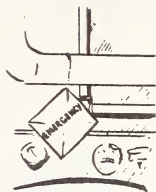
(1) Safety Regulations as required by the United States Coast Guard and Steamboat Inspectors SHALL be posted.

(2) Forest Service power boats SHALL be operated only by physically fit employees who have current licenses covering the classes of vessel and the waters of navigation.

(3) Clear instructions for starting and operating the main and auxiliary engines, anchor gear, radio, etc.



SHALL be prepared and conspicuously posted so that in case of emergency the vessel may be moved by someone other than the Marine Engineer.



(4) All permanent personnel who regularly travel on boats SHALL learn to start and operate the main and auxiliary engines, anchor gear, radio, etc., for emergency use. These operations SHALL be performed frequently enough to assure retention of the ability. Marine Engineers SHALL act as trainers.

(5) While taking on fuel--

- a. Fires SHALL be extinguished.
- b. Motors SHALL be stopped.
- c. There SHALL be no smoking.
- d. Open flame lights SHALL not be allowed.
- e. All portholes within 6 feet of filling intake SHALL be closed.

(6) Operators SHALL--

- a. Know and comply with all navigation regulations.
- b. Currently check all safety equipment, salt water intakes, and horns to insure serviceability. Lights SHALL be checked before they are used.
- c. Check all ports, batten the hatches, and make all deck gear fast before putting to sea.
- d. Allow no one on deck in rough weather unless absolutely necessary.
- e. Keep engine room and bilges well ventilated.



TRAVEL

WATER

f. Keep stove and exhaust pipes insulated and free from soot and carbon.

g. Keep decks free from oil, grease, and unnecessary equipment.

(7) Fuel and water tanks SHALL be inspected and tested annually when ship is overhauled.

(8) When vessel is on the ways, zinc plates SHALL be renewed, fastenings SHALL be inspected for electrolytic action, and all sea cocks and underwater inlets and outlets SHALL be checked.

(9) Standard safety equipment for power vessels 20 to 40 feet in length SHALL be--

a. One lifeboat with oars (in Alaska waters).

b. Life preservers for all persons aboard, including 3 cushion-type and 3 vest-type lifejackets for use on skiff trips; one life preserver at each bunk.

c. One cork lifering on rear side of pilot house.

d. Suitable anchor gear, including sufficient chain and proper size anchor.

e. Fire extinguishers for boats over 20-feet--

1. Gas operated--two 10-pound CO₂ or dry powder, with automatic CO₂ flood system for engine room.

2. Diesel--one 4-pound and one 10-pound CO₂ or dry powder.

f. First aid kit.

g. One 2-cell flashlight with fresh cells.



2.56(10)

2.56 (10) Standard safety equipment for power vessels over 40 feet in length, in addition to (9) above SHALL be--

a. An additional lifeboat with oars (1 round-bottom boat with nested skiff preferred) in Alaska waters, single lifeboat in inland waters.

b. Minimum of fire extinguishers SHALL be placed as follows: Two in engine room, 1 of which shall be a 2-1/2-pound CO₂ type, and 1 each for galley, pilot house, rear compartment, and forward compartment. In addition, vessels powered with gasoline engines SHALL have 1 CO₂ extinguisher of not less than 10 pounds capacity, installed with the nozzle gunned into the bilge beneath the engine, ready for instant release.

c. Supply of caulking, canvas, and sheet lead for emergency repairs.

d. Outboard motor with toolkit and extra shearpins and spark plugs.

e. Three flashlights of minimum 2-cell size.

2.57 SCOWS

(1) Bilges SHALL be checked and pumped before making tows.

(2) Scows SHALL be loaded evenly, with load well lashed.

(3) When towing, check SHALL be made frequently for shifting of cargo or change of draft due to water in the bilge.

(4) Hatches SHALL be kept battened, and man-hole plates SHALL be secured.

2.58 WANIGANS

(1) Life preservers SHALL be provided, accessible to all men aboard.

(2) All compartments SHALL be equipped with fire extinguishers.

(3) First aid kits SHALL be kept well stocked.

(4) Stoves and chimneys SHALL be kept clean, free from soot, and properly insulated.

(5) Escape hatches SHALL be kept free and accessible.

(6) When wanigan is anchored and men are living aboard, a skiff with oars SHALL be kept aboard for emergency use.

(7) Gasoline SHALL not be stored, mixed, or handled inside a building.

2.59 ICE SAFETY

(1) Employees SHALL stay off dangerous ice.

(2) If alone when you fall through ice, put arms in front of you on solid ice, kick to keep body level, crawl forward on stomach until hips reach ice, then make quick full length roll onto ice. Keep rolling until safe. If ice is too thin to support you, break way to shore with one hand, supporting yourself with the other.



2. 59(3)

2. 59 (3) When somebody falls through the ice, warm and dry him as soon after rescue as possible. Do not delay doing this by trying to get him to camp or home if the distance is great.

(4) Rescuers should try to reach victim with pole, board, rope. Walking to ice edge is dangerous and SHALL be a last resort. If necessary to do so, carry a long pole with you or push yourself to the edge in a prone position. Be careful to avoid a double casualty.

(5) Ice harvesting:

a. Workmen SHALL be provided with ice creepers to overcome slippery footing unless slippery ice conditions can otherwise be prevented satisfactorily.

b. Slides of sufficient strength SHALL be provided, with sideboards to prevent cakes from sliding off.

c. Ice cakes SHALL not be lifted onto the trucks or into ice houses.

d. Maximum size of ice cakes SHALL be 18 by 24 inches for hand loading and handling.

e. Ice should be of uniform size, with any irregular edges chiseled off to prevent hazards in handling.

f. Power-driven, ice sawing equipment SHALL be used only by employees previously trained and fully experienced in handling such equipment.



CHAPTER 3

FIRE

LEGEND

CAPITALIZED TEXT--somebody was killed by not observing these practices.

SHALL--denotes a mandatory requirement.
The SHALL's are capitalized for easy reference.

SHOULD--denotes a recommended practice.

It is the duty of each of us
to prevent accidents - and to
protect himself and others
from injury



CHAPTER 3. FIRE

CONTENTS

SUBJECT	Page
3.1 FIRE FIGHTING	
General	71
Fire Fighting Practices ...	74
Travel	77
Equipment	78
Building Fire Fighting	80
Lookout Job	81
3.2 BUILDING FIRE PROTECTION	
General	83
Fire Fighting Equipment...	84
Stoves and Fireplaces	84
Chimneys	86
Flammable Material	87
In Case of Fire	87
Seven Steps to Safety	88
Fire Extinguisher Facts ...	89
3.3 FLAMMABLES	
General	91
Oil Houses	92
Flammable Liquids, Other Than Paint	93
Flammable Paints	96
Fusees	97
Bottled Gas	97
Propane Tanks and Torches	99
Nitrocellulose Film.	100
3.4 LIGHTNING	
General	103
During Lightning Storms When in the Field	103
During Lightning Storms While in Lookout or Other Buildings	104



3.1 FIRE FIGHTING

3.11 GENERAL

(1) These three basic principles SHALL be observed on all fires, regardless of size or manning:

a. RECRUITMENT. --NO WORKERS OR OVERHEAD SHALL BE ASSIGNED TO FIRE DUTY IF THEY ARE UNDERWEIGHT, OVERWEIGHT, OR HAVE HEART, LUNG, OR INTESTINAL DEFECTS. THEY SHOULD BE 18 TO 55. See 9.11, 9.12 Health.

b. TRAINING. --ALL WORKERS SHALL BE INSTRUCTED ON AREA HAZARDS AND SAFE WORKING PRACTICES BEFORE STARTING WORK. OVERHEAD SHALL KNOW THESE PRACTICES FROM EXPERIENCE AND/OR TRAINING. THE FOREMAN SHALL BE IDENTIFIED FOR ALL CREW MEMBERS; THEY SHALL UNDERSTAND HIS AUTHORITY TO ISSUE INSTRUCTIONS AND SHALL FOLLOW INSTRUCTIONS AT ALL TIMES, PARTICULARLY DURING EMERGENCIES. INSTRUCTIONS SHALL BE CLEAR CUT, AND REPEATED UNTIL UNDERSTOOD. See also 1.1 Policy, 7.3 Safety Equipment.

c. ESCAPE AND LOOKOUT PLAN. --ESCAPE ROUTES SHALL BE PICKED TO AVOID TRAPS. FOREMEN AND STRAWBOSSES SHALL THOROUGHLY INSTRUCT MEN ON ESCAPE ROUTE USE. IN HIGH HAZARD AREAS, ESCAPE ROUTES SHALL BE PREPARED IN ADVANCE BY CUTTING WAYS OR MARKING ROUTES SO THERE SHALL BE NO MISTAKE



FIRE

FIRE FIGHTING

DURING A CRITICAL PERIOD. LOOKOUTS SHALL BE POSTED IN POSITIONS SEEING DANGER POINTS, AND WITH PROVISIONS FOR PROMPT COMMUNICATION WITH CREW, TO--

1. WARN MEN OF FALLING TREES, ROCKS, AND SNAGS.

2. KEEP WATCH AND WARN MEN IN CASE OF BLOWUP. IN ADDITION, ALL WORKERS AND OVER-HEAD SHALL BE INSTRUCTED TO WATCH FOR ALL HAZARDS, SUCH AS BLOWUPS, ROLLING LOGS OR ROCKS, AND FALLING TREES, SNAGS, OR BRANCHES. Signals SHALL be pre-arranged for crewmen to use as warning for falling snags or rocks. Examples: For snags or limbs, "Timber." For rolling rocks or logs, "Heads up."



(2) Full-time safety men SHALL be assigned to large or dangerous fires to check and take any corrective action as may be indicated for safety of men on all parts of the fire or in specific problem areas that the fire boss may request; to help screen the physically unfit; to survey fireline, fire camp, and transportation hazards; and to determine how to remove them; to check on Health and Safety Code compliance, safety instructions, the fatigue factor, safety equipment, first aid, medical and sanitation facilities; to investigate accidents; and otherwise to assist the fire boss with safety. Where blowup potential exists, consideration SHALL be given to using a fire behavior specialist to identify especially hazardous conditions.



(3) SITES FOR RESTING, LUNCHING, OR BEDDING DOWN SHALL BE SAFE FROM RUNNING FIRES AND FALLING TREES, ROCKS, SNAGS, VEHICLES, AND PACK STOCK. IF NECESSARY TO SELECT UNSAFE SITE, IT SHOULD BE LOCATED SO AS TO PROVIDE A VANTAGE POINT, OR A LOOKOUT SHALL BE POSTED. See 9.3 Sanitation.

(4) NIGHT CREWS SHALL ARRIVE AT THEIR WORK AREAS IN DAYLIGHT SO THAT DANGEROUS PLACES SHALL BE SPOTTED BEFORE THEY GO ON NIGHT DUTY. MEN SHALL BE WARNED OF UNSAFE WORKING CONDITIONS. OVERHEAD SHALL BE ALERT TO ELIMINATE HAZARDS.



SNAGS



(5) ALL LINE WORKERS SHALL ALWAYS BE ALERT TO THE ACTION OF THE FIRE BECAUSE FIRE CAN OVERTAKE A MAN IN ANY DIRECTION DAY OR NIGHT.

(6) FREQUENT CHECKS BY CREW AND STRAW-BOSSES SHALL BE MADE TO BE CERTAIN THAT ALL MEN ARE SAFE, AND ALWAYS IMMEDIATELY AFTER A FLAREUP.

(7) MEN SHALL BE WARNED TO BE ESPECIALLY CAUTIOUS NEAR HIGH TENSION LINES BECAUSE A LIVE WIRE MIGHT BE ON THE GROUND. See 8.24 Electricity.

(8) REASONABLE REST PERIODS SHALL BE PROVIDED, ESPECIALLY AT HIGH ELEVATIONS AND ON HOT DAYS. SOME RESERVE STRENGTH SHOULD BE KEPT FOR EMERGENCY. SHIFTS



FIRE

FIRE FIGHTING

SHOULD NOT EXCEED 12 HOURS, WITH NOT LESS THAN 8-HOUR REST PERIODS BETWEEN SHIFTS.

(9) PROMPT FIRST AID SHALL BE GIVEN FOR ALL INJURIES, ESPECIALLY FOR BURNS AND SHOCK. SEE FIRST AID GUIDE, PP. 18-21. EXPERIENCED FIRST AID MEN AND ADEQUATE FACILITIES SHALL BE ASSIGNED TO EACH FIRE CAMP. A DOCTOR OR INTERN SHALL BE IN CHARGE WHEREVER POSSIBLE.



(10) FIRE WEATHER FORECASTS SHALL BE STUDIED AND FULLY UTILIZED BY ALL OVERHEAD ON THE FIRE. REMEMBER THAT ORDINARY WEATHER CONDITIONS CAN BE MISLEADING UNLESS THEY ARE ANALYZED THOROUGHLY; i. e., DOWNDRAFTS USUALLY OCCUR IN CANYONS IN THE EVENING, BUT THEY CAN ALSO OCCUR DURING THE DAY.

3.12 FIRE FIGHTING PRACTICES

(1) MEN OR MACHINES SHALL NOT WORK DIRECTLY ABOVE ONE ANOTHER OR AT CLOSE INTERVALS WHEN CONSTRUCTING LINES UP OR DOWN STEEP SLOPES.

(2) THESE SAFETY MEASURES SHALL BE OBSERVED--

a. PASS A BURNING OR FIRE-WEAKENED TREE ONLY ON THE UPHILL SIDE OR ABOVE THE LEAN, AND THEN WATCH IT CLOSELY.

b. ALLOW ONLY SNAG CREW IN SNAG-FALLING AREA. See 5.22.



c. IN FAST BURNING FUELS, WATCH OUT FOR FAST RUNS IN ANY DIRECTION, PARTICULARLY UPHILL, AT ANY TIME OF DAY OR NIGHT. IF AN EFFORT TO CUT ACROSS THE HEAD INVOLVES SLOW ACCESS AND RETREAT, RESORT TO CONTROL BY FLANK ATTACK, STARTING AT A SAFE SECTOR.

d. PATROL BELOW FOR SPOT FIRES FROM HOT MATERIAL ROLLING DOWN. A SMOULDERING FIRE BELOW A CREW CAN RACE UP SLOPE.

e. SLOPES CAN BECOME EXPLOSIVE AT ANY TIME, DAY OR NIGHT. THE SAFEST PLACE TO FIGHT A FIRE IS IMMEDIATELY AGAINST IT. IF FIRE STARTS ACROSS THE LINE BEHIND YOU AND YOU ARE CUT OFF, GET IN THE BURNED AREA.



f. IF IMPOSSIBLE TO GET INTO THE BURNED AREA, PAUSE TO SIZE UP THE SITUATION, THEN ACT IN A POSITIVE, PLANNED MANNER. MAKE YOUR INSTRUCTIONS CLEAR. CONTROL THE MEN UNDER YOU. WHEN THERE IS REASONABLE CHANCE TO REACH FLANKS, THIS IS USUALLY BEST. THE SAFEST ROUTE MAY BE UPHILL, DOWNHILL, OR ALONG THE CONTOUR OF A SLOPE, DEPENDING ON YOUR LOCATION, BEHAVIOR OF THE FIRE, AND THE SPEED YOU CAN SUSTAIN UNDER EXISTING CIRCUMSTANCES.

g. PANIC LEADS TO TROUBLE. Keep a clear mind and act with cold, deliberate logic.

(3) Guides or spotters ahead of fireline dozers SHALL be selected for their physical fitness as well as other qualities; and they SHALL be specially



instructed on job requirements. At night the dozer guide should wear two headlights, one shining to the front and one to the rear, so that the operator can see him at all times.

(4) Men SHALL stay clear of a dozer in operation instead of depending on the dozer operator to keep away from them. Because of the size of rocks a dozer can roll, men should not work below a dozer.



(5) IN DOZER OPERATIONS IN ADVANCE OF FIRE, A SAFETY STRIP SHALL BE BUILT FOR RETREAT IN CASE THE FIRE MAKES A RUN. THIS IS ESPECIALLY NECESSARY WHEN WORKING ALONG RIDGETOP ABOVE FIRE IN CANYON BELOW.

(6) FAST TRAVEL THROUGH DENSE UNBURNED BRUSH OR REPRODUCTION, OR OVER ROCKY GROUND, IS PRACTICALLY IMPOSSIBLE.

(7) GENERALLY FIRE FIGHTERS SHALL NEVER TRY TO OUTFRAN THE HEAD OF A FAST MOVING FIRE. FIRST TRY TO GET AROUND TO THE FLANKS.

3.12 (8)

THE *Really Smart* FOREST FIRE FIGHTER:

- a. ..ALWAYS FOLLOWS
FOREMAN'S INSTRUCTIONS



- b. ..NEVER LETS ANYTHING
STAMPEDE HIM-



- c. ..ALWAYS PICKS ESCAPE
ROUTE, WHEN ALONE, then ..if fire blows up -

..gets inside burn -



..or goes downhill -- or to
safest, most easily
reached flank -



... never tries to outrun
- head of fire -



..calculates chances
carefully.. takes ad-
vantage of whats
there!



GPO : 1956 - O - 389487

3.13 TRAVEL. See also 2.3 Foot Travel.

(1) Trails and routes SHALL be marked and maps consulted to prevent getting lost.



FIRE

FIRE FIGHTING

3.13(2)

3.13 (2) For night travel you SHALL use only those lanterns and lights that are in safe condition and that will produce adequate light. IN CROSS-COUNTRY NIGHT TRAVEL, YOU SHALL WATCH FOR HOLES SUCH AS MINE SHAFTS, WELLS, LAVA CRATERS, AND GROUND CRACKS. ORGANIZATIONAL CONTROL SHALL BE INTENSIFIED.

(3) CLIFFS OR SLIDES SHALL BE CLIMBED UP OR DOWN ONLY AFTER CAREFUL HAZARD SURVEY AND FULL PREPARATIONS HAVE BEEN MADE.

(4) WHEN TRAVELING IN ROCKY COUNTRY, ROCKS SHALL NOT BE DISLODGED ON MEN BELOW. MEN SHALL BE ON THE ALERT FOR ANY ROCKS OR LOGS THAT MIGHT BE DISLODGED. STAGGER MEN SO THAT THEY ARE NOT DIRECTLY BELOW EACH OTHER.

3.14 EQUIPMENT

(1) When fire fighting equipment is parked adjacent to roads, the following precautions SHALL be taken to avoid accidents:

a. Cars SHALL be parked so as to avoid congestion.

b. Tank-truck operators SHALL be trained to use, to the fullest, the side adjacent to the road edge for all operations.

c. If the fire is adjacent to major roads, "Fire Danger" or "Fire Ahead" signs SHALL be placed on the road to warn motorists of possible dangers. Flares should be used when visibility is decreased by smoke or darkness. If necessary, men SHALL be posted to direct traffic.



FIRE

FIRE FIGHTING

(2) Backfiring torches SHALL be used only by trained and qualified workers.

a. Fittings SHALL be kept tight.

b. Straps, fittings, and exterior surfaces of torch SHALL be kept free of liquid fuel and flammable residues.

c. Pack straps SHALL permit rapid removal of torch.

d. Straight gasoline SHALL not be used as a fuel, except in gas-generator-type (Hauck) torches especially designed for gasoline fuel.

e. Torch SHALL not be opened while hot, nor SHALL it be opened or refilled within 50 feet of flames, embers, or sparks.

f. If gasoline-oil mix is essential for drip torches and coal oil burning flame throwers, the mixture SHALL contain not more than one part of gasoline to three parts of Diesel or heavier oil.

g. Kind of fuel SHALL be clearly labeled on all torch fuel supply containers.

h. The weight of back-pack backfiring torches SHALL be limited to less than 40 pounds, full.

i. Backfiring torches SHALL be kept out of hotly burning areas.

j. No one with oil on his clothes SHALL use a flamethrower or approach an open fire.

k. A kerosene-burning flamethrower that projects flaming oil SHALL be fired with the wind if possible, quartered or at right angles if necessary, and never against the wind.

l. Ignition end of torch SHALL be held away from body when being lighted.

m. Nonpressurized back-pack containers for torches SHALL not be used.



3.14(3)

3.14 (3) Use of fusees:

a. They SHALL be carried in the hand or in a container, not in clothing.

b. A handle should be made from a stick or a limb.

c. Lighted fusees SHALL be held so that hot slag won't fall on the body.

d. Fusees SHALL be stored in metal containers or in wooden boxes when kept in animalproof enclosures.



3.15 BUILDING FIRE FIGHTING

(1) Rescue victims and give first aid.

(2) Be sure water supply and extinguishers are functioning. Beware of whipping high-pressure hose.

(3) Be sure electric current is off, especially if water or chemicals are used.

(4) Ventilate so building can be entered:

a. Open top floor windows from top.

b. Open windows between top and first floors from both top and bottom.

c. Open first floor windows from bottom.

(5) Aim hose at base of flames.

(6) Protect adjacent buildings.



3.16 MISCELLANEOUS FIRE FIGHTING

(1) To put out gas fire, water should be used to cool area until leak can be shut off or until gas has vaporized, after which dry powder or CO₂ is effective.

(2) To put out vehicle fire, turn off ignition, shoot extinguisher through hood louvers. If an extinguisher is not available, smother the flames with sand, dirt, blanket, or coat. Water SHALL never be used on a gasoline or oil fire.



3.17 LOOKOUT JOB

(1) Tower legs, stairway and treads, platform, and railing SHALL be inspected at least twice a year.

(2) Catwalks SHALL be equipped with safety gates to prevent people from falling or stepping into trapdoor opening to stairway. Catwalks and stairways SHALL be protected with woven wire where children have access to the tower.



(3) Lookout tower SHALL be equipped with drop gate, to prevent people from walking into stair well when trapdoor is open. Drop gate SHALL be hinged off balance, so it will automatically drop in place unless fastened up.

(4) Tower radio, telephone, wiring, lightning arrester installation, and ground SHALL be inspected



before occupancy, frequently thereafter, and after every lightning storm. Posted rules on Standard Form 901 SHALL be followed during storms.

(5) Do not hurry when going up or down the tower stairway.

(6) Dispatcher SHALL make radio or phone checks on lookouts after storms, and before and after they make trips alone, to permit a check on their safety.

(7) "NOTICE TO VISITORS" sign SHALL be posted at the foot of each tower.

(8) See 3.3 Flammables, 3.4 Lightning, and 8.44 Heaters.



TEN STANDARD FIRE FIGHTING ORDERS

1. Keep informed on FIRE WEATHER conditions and forecasts.
2. Know what your FIRE is DOING at all times-- observe personally, use scouts.
3. Base all actions on current and expected BEHAVIOR of FIRE.
4. Have ESCAPE ROUTES for everyone and make them known.
5. Post a LOOKOUT when there is possible danger.
6. Be ALERT, keep CALM, THINK clearly, ACT decisively.
7. Maintain prompt COMMUNICATION with your men, your boss, and adjoining forces.
8. Give clear INSTRUCTIONS and be sure they are understood.
9. Maintain CONTROL of your men at all times.
10. Fight fire aggressively but provide for SAFETY first.

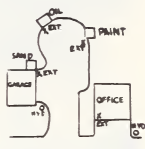
Every Forest Service employee who has fire fighting duties shall learn these orders and follow each order when it applies to his assignment.



3.2 BUILDING FIRE PROTECTION

3.21 GENERAL

(1) A practical diagrammatic fire plan SHALL be posted at stations and permanent camps. Plan SHALL show buildings, hydrants, extinguishers and other types of fire equipment, fuse boxes, means of escape, chain of command, and individual responsibilities. All personnel, including families living at stations, SHALL be familiar with the plan and SHALL participate in fire drills.



(2) Special rodentproof containers SHALL be used for all but safety matches in forest area buildings.

(3) Fires SHALL not be started with flammable liquids such as gasoline or kerosene.



(4) There SHALL be clear passageways to electric switches, extinguishers, hydrants, and exits.

(5) The responsible officer in charge of a building installation or facility SHALL see that the building or facilities such as pressure vessels, boilers, elevators are inspected by qualified Federal, State, municipal, or private inspectors. These inspections SHALL meet local or nationally recognized code



3.21(5)

standards, whichever is most stringent. Minimum inspection requirements SHALL be yearly for boilers, pressure vessels, and heating facilities, and twice yearly for elevators.

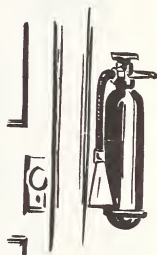
3.22 FIRE FIGHTING EQUIPMENT

(1) Fire fighting equipment, such as Underwriter Laboratory approved extinguishers or sand and water containers, hydrants, and ladders as needed, SHALL be provided for all buildings where fire hazards exist and in buildings where city fire department service is not available and the hazards warrant it.

(2) In outlying stations where no special fire hazards exist, fire fighting equipment is not necessary for all buildings, but equipment SHALL be available nearby.

(3) Shovels, dry sand in covered containers, or other more suitable extinguishing agents SHALL be placed at accessible sites within or adjacent to repair shops, oil or gas dispensers, and other high-hazard areas. Sand SHALL be checked frequently to be sure it is dry.

(4) Extinguishers SHALL be placed near doors for quick availability. Where fire could block access to them, they SHALL be mounted outside the building.



3.23 STOVES AND FIREPLACES

(1) Stoves, pipes, and chimneys SHALL be kept in good repair, and inspected annually. Dangerous accumu-

lations of 1/2 inch or more of soot and creosote SHALL be scraped or burned out.

(2) Stoves SHALL be installed at least 1 foot from combustible walls, provided there is a metal or asbestos shield 1 foot wider and higher than stoves, with a 1-inch open air space between shield and wall. If no shield is used, stoves SHALL be at least 2 feet away from combustible walls.



(3) A metal or other fireproof floor shield extending 6 inches beyond all sides of the stove SHALL be used on combustible floors. A minimum ventilated air space of 5 inches SHALL be provided between stove bottom and combustible floor.

(4) Bottomless stoves and those having fire boxes or ash pits supported directly on the floor SHALL have noncombustible bases.

(5) Pipe railings or metal screen guards 3 feet high and at least 18 inches from stoves SHALL be provided in shops and warehouses.

(6) A damper should be provided for wood stove pipes 4 feet or more in length. Pipe SHALL be well braced and fastened by metal screws, stove bolts, rivets, or wire. Defective pipe SHALL be replaced.

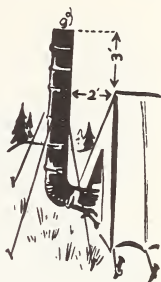
(7) Spark arresters or two elbows offsetting a straight pipe SHALL be required for each wood-burning stove in tent camps.



3.23(8)

3.23 (8) The installation of spark arresters on permanent structures SHALL be optional with Regional Foresters and Directors, subject to local ordinances.

(9) Vertical pipe outside of tents SHALL be at least 2 feet from the wall and should extend 3 feet above the ridge of the tent. Only metal guys SHALL be used.

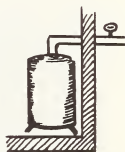


(10) Fireplaces SHALL be equipped with screens.

(11) Live ashes taken from stoves SHALL be removed from buildings at once and disposed of in a safe place.

(12) Woodboxes, beds, clothing, etc. SHALL be kept a safe distance from heating apparatus.

(13) Pipelines and connections used for conveying fuel to oil burning stoves or furnaces SHALL be kept tight. If tank is outside building, shutoff valve SHALL be provided at tank, for use in case of fire inside building.



3.24 CHIMNEYS

(1) New chimneys SHALL be built from the ground up.

(2) All stovepipe should go directly into the chimney. Stovepipe extending through a wall or ceiling SHALL be provided with a double metal ventilated thimble not less than 8 inches larger in diameter than the pipe; the annular space SHALL be filled with mineral or rock wool.

3.25 FLAMMABLE MATERIAL

(1) Oily cleaning rags or mops SHALL be stored in a safe place.

(2) Metal cans with good covers SHALL be provided for oily shop rags. Cans SHALL be emptied frequently.

(3) All flammable debris in all buildings SHALL be disposed of promptly.

(4) Flammable materials such as dry grass, weeds, and brush SHALL be cleared for a safe distance, at least 25 feet if possible, around buildings, tent camps, and oil or gasoline dispensers.

(5) Roofs SHALL be kept free of flammable material, and hazardous branches SHALL be cut near chimney or stovepipe outlets.



3.26 IN CASE OF FIRE--

(1) Turn in an alarm at once.

(2) Disconnect electricity supply.

(3) Remember your part in fire plan and do your job well.

(4) Use the right type of extinguisher.

(5) Use equipment correctly. Do not delay.



3.26(6)

3.26 (6) Make certain the fire is out.

(7) Be sure that any equipment involved is made ready for re-use.

3.27 SEVEN STEPS TO SAFETY

(1) Know the nearest regular and emergency exits of any building you may be in, including your overnight lodgings.

(2) If you detect fire or smoke, act quickly but coolly. Notify the telephone operator or other source of help. Give exact information.

(3) Touch a door before you open it. IF IT IS HOT, KEEP IT CLOSED. Close transoms and cover cracks around the door.






(4) Take no unnecessary chances to get out of the room. Unless in immediate danger, you may be safer where you are.

(5) If the door is cool, open it a little. If the hall appears safe, leave by a known exit.

(6) If you must leave through heavy smoke, stay close to the floor. A wet cloth over your face may help breathing.

(7) Close doors and windows behind you to reduce drafts and slow down the spread of fire.

FIRE EXTINGUISHER FACTS

Type and Operation	Contents	Kinds of Fire and Use				Subject to freezing	Yearly maintenance	Comments
		A-- Wood rubbish	B-- Oil, grease, flammables	C-- Live elec. equip.	D-- Motor vehicles			
(1) 	Dry chemical bicarbonate of soda and drying agent--pressure small by CO ₂ gas cartridge--preferred type of extinguisher	NO	YES	YES	YES	NO	Weigh gas cartridge, check nozzles and hose-tag.	Very effective extinguisher. Easy to use because it cools fire rapidly. Easy to maintain.
(2) 	Liquid CO ₂ under pressure--acceptable type of extinguisher	NO	YES	YES	YES	NO	Weigh and tag.	Must be returned to distributor or factory for re-charging.
(3) 	Carbon tetrachloride--not to be used after 6/30/58	NO	YES	YES	YES	NO	Partly discharge, refill to capacity if OK, check pressure and corrosion-tag.	Carbon tet fumes and those generated when fluid hits hot metals are dangerous. Extinguisher difficult to maintain.
(4) 	Solution of aluminum sulfate and bicarbonate of soda.	YES	YES	NO Elec- tric shock danger.	NO	YES	Empty, clean, re-charge, and tag yearly; protect from freezing.	Before emptying be sure hose and nozzle are not plugged. Then unscrew top and carefully remove chemicals to prevent possibility of an explosion. Check hose and nozzle frequently throughout the year for plugging.
(5) 	Bicarbonate of soda and sulfuric acid.	YES	NO	NO Elec- tric shock danger.	NO	YES	Empty, clean, re-charge, and tag yearly; protect from freezing.	





3.3 FLAMMABLES

3.31 GENERAL

(1) NO SMOKING signs SHALL be posted on the inside and outside of all buildings and locations storing flammables.

(2) Smoking, open flames, or sparks SHALL not be permitted within 50 feet of where flammables with a flash point below 100° F. are stored or used.

(3) Containers used for any flammable SHALL be tagged to show contents and SHALL be closed tightly when not in use, whether full, partly full, or empty.



(4) When filling containers, a vapor space SHALL be left above the liquid level to permit expansion with rising temperatures.

(5) Motors SHALL be shut off before filling fuel tanks.

(6) Flammables with flash points below 100° F. SHALL not be stored or transported in glass containers larger than 1 pint.

(7) Dry cell batteries SHALL not be disposed of in a fire.



3.31(8)

3.31 (8) Fireproof containers SHALL be provided for oily rags or flammable rubbish. Contents SHALL be disposed of currently.

(9) Nobody SHALL work in clothing soaked with flammables.

(10) Static electricity precautions--

a. Storage platforms for all flammables with flash point below 100° F. SHALL be grounded to prevent accumulation of static electricity.

b. All tank trucks SHALL have tank grounded to the truck frame and SHALL have a positive bond between truck and fill pipe.

c. Delivery hose or gas cans SHALL be grounded by holding the nozzle or spout against the container being filled.

d. Nonstatic generating materials other than wool, silk, and nylon SHALL be used to clean up spilled gasoline.



(11) Flammable liquids SHALL be kept away from radios or other non-vaporproof electrical equipment in unventilated places.

3.32 OIL HOUSES

(1) Drums of flammables SHALL be stored in separate oil houses or on shaded racks or loading docks 50 feet from other buildings.

(2) Oil-house floors SHALL be made of fire-resistant material.

(3) Doors SHALL open outward or be of the overhead lift-up or sliding-panel type.

(4) Proper ventilation SHALL be provided to prevent accumulation of vapors.



(5) Electric light globes SHALL be protected, to avoid accidental breakage. All fixtures and switches SHALL be vapor- and spark-proof where explosion hazards exist.

3.33 FLAMMABLE LIQUIDS OTHER THAN PAINT

Flammable liquids are those that give off flammable vapors at or below 200° F. They are dangerous when they are in open containers, when they leak or spill, or when they are heated. The degree of danger is determined by the flash point, whether the vapor-air mixture is in an explosive range, and the possibility of a source of ignition. The flash point is the lowest temperature at which a liquid gives off enough vapor to burn when lighted. A flash point of 100° F. is the point at which relative hazards change; below 100° F. flammable liquids become increasingly more hazardous as the flash point lowers.

Flash Points of Commonly Used Liquids in Degrees Fahrenheit

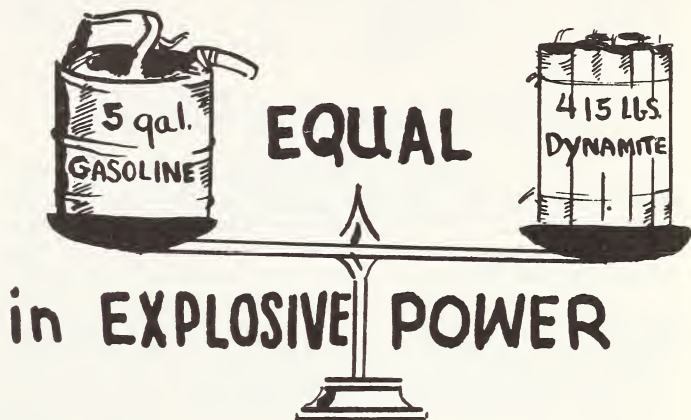
Gasoline	-45	Ether	45
Acetone	-1	Alcohol	52 to 91
Lacquer	0 to 80	Varnish	80 or less
Paint	0 to 80	Mineral spirits	85
Shellac	40	Turpentine ...	95



FIRE

FLAMMABLES

Diesel fuel	100	Penetrating	
Kerosene	100 to	oil	110
	115	Creosote oil .	165
Stoddard solvent	100 or	Machine oil ..	300
	higher	Motor oil	315
Fuel oil, burner.	100 to	Linseed oil ..	403
	200		



(1) At permanent stations, underground storage tanks SHALL be provided for 100 gallons or more of gasoline. Underground storage tanks SHALL be vented by a pipe of not less than 1 1/4 inches inside diameter.

a. The lower end SHALL extend not more than 1 inch into the top of the tank.

b. The upper end SHALL have a weather-proof fitting.

c. The vent SHALL terminate outside, not closer than 2 feet from any building opening.

d. It SHALL extend 8 feet above the top of the fill pipe.

(2) Small amounts of gasoline SHALL be stored in closed drums or safety cans in separate buildings or outside, but not in the sun.



(3) All gasoline or other flammable fluids with flash points under 100° F. SHALL be handled by Underwriter Laboratory approved pumps or in Underwriter Laboratory approved safety cans, labeled as to contents.

(4) Gasoline and other flammable fluids SHALL not be stored on equipment, except for 1 day's supply in fuel tanks or safety cans.



(5) Gasoline may be kept in warehouses with assembled fire suppression units, if no more than one 10-gallon can SHALL be assigned to each unit, provided such storage conforms with local laws. When the fire season is over, gasoline cans SHALL be removed from the units and stored in the oil house.

(6) Gasoline and kerosene lamps SHALL be filled in daylight hours out of doors.

(7) Workers SHALL be instructed in care and use of gas lanterns.



(8) Spilled gasoline, kerosene, or oil SHALL be wiped up at once. Gasoline spilled on any part of body SHALL be washed off immediately.



3.33(9)

3.33 (9) Substantial closed metal cans SHALL be used for handling and storing flammables.

a. Underwriter Laboratory approved safety cans SHALL be used indoors.

b. Army jeep or blitz cans may be used on rough field work.

c. For permanent use, gasoline cans SHALL be red and labeled.

d. Temporary cans SHALL be identified with a red tag marked "gasoline."

e. Kerosene can be stored in dwellings in 2-gallon closed cans but they SHALL be kept away from flames and sparks, at temperatures well below 100° F.

f. A safety can that leaks more than 4 drops per minute when inverted SHALL not be used until repaired.



3.34 FLAMMABLE PAINTS

(1) Paint should be stored in an oil house or in other special building.

(2) Storage of unopened paint containers SHALL be permitted in a safe, well-ventilated storage space not exposed to excessive heat, when oil house or other isolated structure is not available, if adequate fire protection is provided.

(3) Opened containers of paint or lacquer thinners exceeding 5 gallons SHALL be stored in oil house. Up to 5 gallons, in current use, should be kept in a metal locker in a repair shop, office, or warehouse. Cans SHALL be tightly covered.

(4) Neither smoking nor open flame SHALL be permitted in rooms where spray guns are in operation.

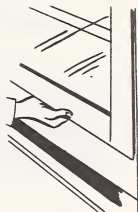
FIRE

FLAMMABLES

(5) When painting indoors, adequate ventilation SHALL be provided.

(6) Paint rags SHALL be disposed of currently.

(7) Pressurized paint containers SHALL be kept in the shade. They SHALL not be disposed of by burning.



3.35 FUSEES

(1) They SHALL be kept clean, dry, and away from steam, water, oil, or excessive heat.

(2) 500 fusees or less can be stored in a rodent-proof container in a warehouse or fire cache.

(3) More than 500 fusees should be stored in their original containers in structures built for flammables.

(4) Defective fusees SHALL be destroyed by burning, but not in a stove.

3.36 BOTTLED GAS

This gas, like gasoline vapor, is heavier than air. It will flow long distances and settle in low places in explosive mixtures.

(1) All ordinances, Underwriters' Laboratory standards and Petroleum Engineers' recommendations on bottled gas storage, installation, and use SHALL be observed.



3.36(2)

3.36 (2) Each installation utilizing bottled gas SHALL be inspected and approved by the local authority having jurisdiction.

(3) Tanks containing butane and other liquified gases SHALL be transported, used, and stored with the safety valve protected, and always with good ventilation.

(4) Tanks in snow or sleet country SHALL be protected to prevent breaking of connections. Tanks SHALL be placed on firm foundations, with supports for holding tanks upright and pipes in position.



(5) Tanks SHALL not be dropped.

(6) Tanks SHALL not be repainted except with the permission of the owner, and then only with paint with a heat reflecting surface equal to aluminum or white:

(7) No container other than that furnished by a distributor SHALL be used for bottled gas.

(8) Gas regulators SHALL be checked only by authorized persons.

(9) No cylinder SHALL be located within a building enclosed on 4 sides, nor within 5 feet of a source of ignition, nor below ground, nor below ground level, nor with the outlet less than 5 feet away from any building opening that is below the level of such outlet.

(10) Regulating or filling equipment on tanks or cylinders SHALL not be less than 15 feet from any opening into or



FIRE

FLAMMABLES

under a building if such opening is below the level of the outlet of the regulating or filling equipment.

(11) Stoves.

a. Workers SHALL install and maintain them in accordance with local ordinances and Underwriters' Laboratory standards.

b. Operating instructions SHALL be permanently posted.

c. Extra care SHALL be used when lighting stoves; gas is heavier than air and does not escape up the vent.

d. Match SHALL be lighted first; then the valve SHALL be opened.

(12) When tracing gas leaks, employees SHALL--

a. Forbid smoking or any open flame or spark.

b. Close gas cock.

c. Open windows and doors.

d. Apply soapy water with brush to connections and watch for bubbles revealing leak.

e. Call gas company or fire department if leak is serious.



3.37 PROPANE TANKS AND TORCHES

(1) They SHALL be stored in a cool dry place, top end up, and safely away from fire, with smoking prohibited.

(2) They SHALL be transported with top end up, fastened down, fixtures tight, and handled carefully.



3.37(3)

3.37 (3) In filling propane torches--

- a. Supply tank SHALL be placed higher than receiving tank..
- b. 10-percent filler safety valve SHALL be attached in place in torch tanks.
- c. Supply tank SHALL be warmer than receiving tank, accomplished by--
 1. Placing supply tank in warm room for 1 hour or more prior to transfer.
 2. Placing supply tank in sun and receiving tank in shade.
 3. Submerging receiving tank in water colder than the air.
 4. Wrapping hot blankets around the supply tank.
 5. Pouring hot water over the wrapped or unwrapped supply tank.
- d. Propane SHALL be kept away from person or clothing.

(4) Propane tanks, empty or filled, SHALL be protected from hot sun and fire at all times.

3.38 NITROCELLULOSE FILM

(1) All employees who use the film SHALL be informed of its explosive and toxic characteristics.

(2) Storage and use SHALL conform with National Board of Fire Underwriters and local fire codes.

a. All wiring and equipment SHALL conform to the National Electrical Code.

b. Only incandescent electric lights SHALL be permitted; they SHALL be protected with substantial wire guards, vaporproof globes, or both.

c. Portable lights on extension cords SHALL not be used in any storage room or vault.

FIRE

FLAMMABLES

- d. Illuminators SHALL be built so that the diffusing glass does not become overheated.
- e. Film driers SHALL be sparkproof.

(3) Storage of not more than 1000 pounds of film in cabinets in one location SHALL be allowed, provided that the location is equipped with automatic water sprinklers and vented to the exterior of building.

- a. No cabinet SHALL contain more than 250 pounds.

- b. Storage of less than 100 pounds need not have sprinklers, providing cabinet is so constructed and insulated that each roll of film is in an individual compartment where it could burn without igniting adjacent film.

- c. Fire extinguishers of types using water or water solutions SHALL be provided for the protection of all rooms containing film where sprinklers are not installed.

(4) Storage of over 1000 pounds of film SHALL be in fireproof vaults.

- a. Vaults should be located on roof or top floor so that they can be vented to the outside.

- b. Vents SHALL be in the ratio of 1 square inch of vent area per 5 pounds of film storage.

- c. Vents SHALL be located at least 50 feet from nearest wall opening.

(5) No film SHALL be stored within 2 feet of steam pipes, radiators, or other sources of heat.

(6) Smoking SHALL be prohibited in rooms where film is handled or stored; "NO SMOKING" signs SHALL be conspicuously posted in prominent places.



3.38(7)

3.38 (7) Proper warning SHALL be marked on the file or the container.

(8) Discarded film SHALL be stored and handled in the same manner as other film until removed from the premises.

(9) All 16 mm. film is safe, and all aerial film delivered subsequent to 1940 is acetate base safety film.

FIRE

FLAMMABLES



3.4 LIGHTNING

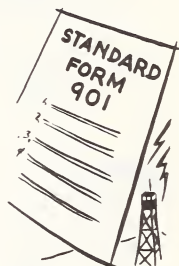
3.41 GENERAL

(1) Every precaution SHALL be taken to keep injuries and losses at a minimum.

(2) All lightning-protection installations SHALL be checked at beginning of season and also after direct strikes.

(3) Switch handles SHALL have rope throws to reduce chance of shock.

(4) See Lightning Protection Handbook for methods of grounding and installation of radio antennae, and Form 901 for instructions for use of phone during storm. The same methods SHALL be used for any structure in an exposed location.



3.42 DURING LIGHTNING STORMS WHEN IN THE FIELD

(1) Employees SHALL discontinue working in the open and SHALL--

a. Get within a metal shield, such as a car, tractor, or crane cab.



FIRE

LIGHTNING

3.42(1)b.

3.42 (1) b. Seek shelter in dense woods, a grove of trees, if possible a stand of young growth, a cave, a depression in the ground, a deep valley or canyon, or at the foot of a steep cliff.

c. Choose shelter in this order.

1. Large metal or metal-frame buildings.

2. Buildings with lightning protection.

3. Large unprotected buildings.

4. Small unprotected buildings.

d. Get under a steel bridge, but never touch the steel; and never sit or stand on damp ground.

e. Sit or lie down.

f. AVOID LARGE OR LONE TREES.

g. GET AWAY FROM HORSES AND STOCK.

h. AVOID TOPS OF RIDGES, HILLTOPS, WIDE OPEN SPACES, LEDGES, AND OUTCROPS OF ROCKS, AND SHEDS OR SHELTERS IN EXPOSED LOCATIONS.

i. Keep away from wire fences, telephone lines, and metal tools. If absolutely necessary to work on telephone line with a lightning storm in the distance, the line SHALL be grounded in the direction of the storm before repairs are attempted. Stay away from rivers and lakes.



3.43 DURING LIGHTNING STORMS WHILE IN LOOKOUT OR OTHER BUILDINGS

(1) Employees SHALL--

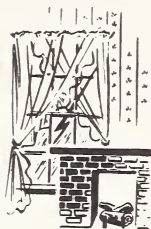
a. Stay inside building and away from all metal objects and the walls.

FIRE

LIGHTNING

b. Never use the phone or radio while storm is overhead. Disconnect the incoming telephone line from the lookout; ground the instrument by pulling the rope attached to the switch handle of the combination arrester-disconnect switch.

c. Close and keep away from windows, doors, and fireplaces. Lightning follows air currents.



FIRE

LIGHTNING



CHAPTER 4

PUBLIC SAFETY

LEGEND

CAPITALIZED TEXT--somebody was killed
by not observing these practices.

SHALL--denotes a mandatory requirement.
The SHALL's are capitalized for easy
reference.

SHOULD--denotes a recommended practice.

It is the duty of each of us
to prevent accidents - and to
protect himself and others
from injury



CHAPTER 4. PUBLIC SAFETY

CONTENTS

SUBJECT	Page
4.1 GENERAL	
Search and Rescue	109
Traveling Public	110
Aviation	111
4.2 RECREATION	
Recreation Areas	113
Special Uses	113
Avalanche Control	114
4.3 OFF THE JOB	
General	117
Recommended Home Safety Code	117
Hints	117
Chemicals	118
Fire Hazards	118
Electrical Hazards ...	119
Gas Hazards	119
Miscellaneous Hazards	120
Yards, Gardens, Hobbies, and Trips	121
Hand Tools	121
Outside Work	121
Hobbies	122
Trips	122



4.1 GENERAL PUBLIC SAFETY

4.11 SEARCH AND RESCUE

(1) Primary responsibility for emergency assistance within national-forest boundaries is placed on sheriffs in some States and on highway patrols in others. In Alaska, U. S. Commissioners and Postmasters are responsible. The Air Rescue Service of the United States Air Force is responsible for crashed aircraft and rescue of victims within the boundaries of the United States; in Alaska, the United States Coast Guard is responsible. The Forest Service SHALL assist these primary agencies as follows:



a. Persons who are lost, seriously ill, or injured, or who die within the exterior boundaries of the national forests SHALL be searched for and transported to the nearest place where there are interested parties or local authorities, if the situation can be met only through action by the Forest Service. When practicable, immediate steps SHALL be taken to get clearance with the primary agency in each case. Deceased persons SHALL not be moved without the approval of appropriate authorities.

b. If search starts within the exterior boundary of a national forest, it can extend to areas immediately outside, if the emergency warrants it.

c. For minor accidents, if there is no immediate danger to life or health, incidental help, information, or advice SHALL be given.



PUBLIC SAFETY

GENERAL

4.11(1)d.

4.11 (1) d. For major accidents such as drowning, serious injuries, or lost persons, every assistance SHALL be given until the legally designated agency can take over.

e. In air rescue work we SHALL render immediate aid where lives may be saved when the primary agency cannot arrive in time to do so, and also we SHALL--

1. Assist the primary agency in arrangements for transportation to the crash area, including taking ground crew to the scene.

2. Provide observer assistance where air search is necessary.

3. Furnish maps, details as to forest organization, and best routes of travel to crash area.

f. Crews searching for lost persons SHALL carry first aid kits, also hot drink or food when practicable.

g. For further details on cooperative agreements with airlines, Air Forces, primary agencies, see Forest Service Manual Vol. 1 GA-C11(1)-(3).



4.12 TRAVELING PUBLIC

(1) Regular traffic rules SHALL be applied wherever possible.

(2) Where departure from regular traffic rules is necessary, such as on some logging projects, the following steps SHALL be taken:

a. Public use of the Forest Service road SHALL be permitted only on certain hours or days. Traffic SHALL be rerouted where possible when regular traffic rules are not in effect.

b. If traffic cannot be re-routed, signs SHALL be conspicuously posted at each end of the road, worded about as follows: DANGER--LOGGING TRUCKS HAVE RIGHT-OF-WAY.

c. Whenever loaded trucks must travel in the left-hand lane, all vehicles traveling in the same direction SHALL be routed in that same lane. All opposing travel SHALL be routed over its left-hand lane.

d. When special driving rules are in effect, all approaches and frequent strategic places along the route SHALL be posted with reminder signs. Return to regular traffic rules SHALL be posted also.

e. Signs SHALL be immediately removed as soon as special driving rules are no longer needed.



4.13 AVIATION

(1) Permits to power companies SHALL require safe line locations to minimize high line hazards, marking towers at ends of long spans, avoiding if possible putting lines across lakes or canyons, and conspicuously marking static or other lines endangering aircraft.







4.2 RECREATION

4.21 RECREATION AREAS

(1) All facilities SHALL be kept in safe operating condition and all hazards SHALL be eliminated.

(2) Developed swimming areas SHALL have depth markers.

a. Lifesaving equipment should be provided if possible.

b. Diving facilities SHALL meet American Red Cross Standards.

(3) Reasonable competence in skiing should be required of personnel administering winter sports areas.

(4) Extraordinary hazards on ski areas, such as cliffs, SHALL be adequately marked by signs or barricades.

(5) See also 9.3 Sanitation, and Forest Service Manual, vol. III NF-G.

4.22 SPECIAL USES

(1) Special use resorts SHALL be inspected critically and periodically from the safety and sanitation standpoint, to prevent unsatisfactory conditions.

a. Structures SHALL be strong enough to carry heavy snow loads if used in the winter.



4.22(1)b.

4.22 (1) b. Buildings SHALL have adequate fire exits.

c. Dormitories SHALL not be overcrowded.

d. Permittees SHALL be required to eliminate all hazards to public health and safety.

(2) State sanitary laws SHALL be observed in developed areas having water supply, bath houses, toilets, and beaches.

(3) Ski lifts and tows SHALL be inspected frequently during operation to be sure they meet all safety requirements. See Forest Service Manual NF-G-Appendix (23)-(30) for Standards.

(4) An adequate ski patrol, either paid or voluntary, SHALL be on duty on ski areas whenever lifts or tows are being operated.



4.23 AVALANCHE CONTROL

(1) All areas threatened by avalanches due to weather conditions, blasting, or possibility of release by the party enroute SHALL be closed to the public.

(2) This work SHALL be done only when snow conditions are suitable.

(3) No man SHALL be considered competent to handle explosives in avalanche control work until he



PUBLIC SAFETY

RECREATION

is a licensed blaster, has received training in ski mountaineering, has actually handled explosives in the field, and has demonstrated his proficiency in all phases of the operation, including the following:

- a. Permanent and field storage.
- b. Public safety procedures.
- c. Party safety procedures.
- d. Preparing and placing charges.
- e. Ski mountaineering, including use of the Health and Safety Code.



(4) Leaders of avalanche blasting parties SHALL be especially trained not only in the handling of explosives in general but also for this particular purpose.

(5) See Avalanche Handbook.







4.3 OFF THE JOB

4.31 GENERAL

(1) The Forest Service does not intend to dictate what you do at home, but it is our earnest desire to help you there as well as on the job. The Jefferson National Forest suggested that we develop a recommended Home Safety Code, because safety begins at home. Here it is!

4.32 RECOMMENDED HOME SAFETY CODE

(1) Helpful hints for a foolproof home safety campaign:

- a. Hazard hunts--Conduct regularly.
- b. Analyze hazards.
- c. Prepare plan of action.
- d. Put plan to work--Entire family participate.
- e. You appoint selected member to check on correction of hazard.

HERE IS THE
FORMULA FOR
A SAFE, HAPPY
HOME!



(2) Safety-minded attitudes shall be maintained all the time, with parents setting the example.

(3) All members of the household, including children, shall be instructed in what to do in emergencies. Know location of First Aid Guide, how to locate a doctor, how to report and what to do about fires.



4.32(4)

4.32 (4) Chemical hazards shall be handled as follows:

a. Medicines.--Keep in properly labeled containers in a special cabinet away from food and children. Never take medicine in the dark. Always read the label.

b. Poisons, Fumigants, Disinfectants, and Insecticides.--Keep in tight, labeled containers away from food and children.

c. Acids and Caustics.--Handle carefully. Use rubber gloves, rubber aprons, and rubber-framed goggles. Wash hands before handling foods. Always pour acids into water, never water into acids. Avoid fumes.

d. Paints, Varnishes, etc.--Avoid fumes, use in well-ventilated rooms. Be sure the paint on children's toys and furniture does not contain poison. Wash hands before eating.

e. Refrigerants.--Buy Underwriters' Laboratory approved refrigerators only; have competent serviceman install and repair; if leak occurs, ventilate room and shut off machine.

f. Polishing and Cleansing Materials.--Keep in tight labeled containers away from food and children. After using, wash hands before eating.

(5) Fire hazards shall be eliminated. To do this--

a. Keep matches away from children.

b. Do not allow combustible waste to accumulate.

c. Keep stoves and chimneys clean, tight, and insulated.

d. Keep oily rags in tight metal can.



- e. Fill oil or gasoline lamps and stoves while unlighted outdoors.
- f. Never use flammable cleaning solvents.
- g. Keep curtains away from open flames.
- h. Do not use candles on Christmas trees.
- i. Keep celluloid and other flammables away from heat.
- j. Burn trash only in a safe place.

(6) Electrical hazards shall be avoided:

- a. A qualified electrician shall install and inspect wiring.
- b. All electric appliances shall be turned off when not in use.
- c. Circuits shall not be overloaded.
- d. Extension cords and wiring shall be repaired if insulation is defective.
- e. Base plugs shall be made inaccessible to small children wherever possible.
- f. Bathroom switches and pull chains shall be made of non-conductive material.
- g. Appliances such as washing machines shall not be operated where a person can be a conductor of a short circuit, such as standing on a wet floor and touching the machine.

(7) Gas hazards:

- a. A qualified plumber shall install and service all gas plumbing and appliances.
- b. Leaks shall not be investigated with an open flame.
- c. If you detect a leak, ventilate the room and turn off the gas.
- d. Bottled gas shall be stored outdoors in a well-ventilated place--never in a basement.



4.32(7)e.

4.32 (7) e. Stoves and heaters shall be provided with exhaust vents.

(8) Preventing falls. --Repair defective ladders; varnish, never paint ladders; don't use makeshift supports. Keep stairs repaired, clear, well lighted; install handrails. Remove ice and snow from side-walks and stairs; use nonskid wax inside. Use rubber mat in bathtub and shower.

(9) Miscellaneous hazards shall be handled this way:

a. Dispose of broken glass, tin cans, nails, tacks, and razor blades in a safe manner.

b. Keep furniture and other objects out of customary travel paths.

c. Stack heavy articles in a safe manner and place.

d. Wipe up spilled liquids and semi-liquids.

e. Never place a pillow in infant's bed.

f. Never carry an infant and a vessel of hot liquid at the same time.

g. Keep handle of cooking vessels turned away from edge of stove.

h. Protect children from electric shock by covering outlets and using thick insulated cords.

i. Keep wild pets away from infants.

j. Keep extra electric fuses and flashlight handy.

k. Keep first aid kit and First Aid Guide handy.

l. Toys and Playthings: Lead paints shall not be used. Avoid small articles or parts that can be broken off and swallowed by children. Paints and crayons should be kept from children's mouths. Never handle electric toys with wet hands. Special caution is urged in handling model internal-combustion engines,

construction toys, chemical sets, and toy weapons. Fly kites in dry weather, and use cotton string, away from wires.

m. KEEP CHILDREN OUT OF ADMINISTRATIVE SITES AND AWAY FROM PLACES WHERE CREWS AND MACHINES ARE WORKING.

n. Watch out for children in driveways.

4.33 YARDS, GARDENS, HOBBIES, AND TRIPS

(1) Hand Tools:

a. Use the right tool for the right job. Use tool properly. Keep tools in safe condition and store in a safe place.

b. Use pry-type can opener with care.

c. Wash sharp knives separately. Do not use to open cans. Keep in racks away from children.

d. Handle scissors carefully. Never let children use sharp-pointed scissors. Store in safe place away from children.

(2) Outside work:

a. Driveways and Walks. --Avoid deep and steep driveways. Keep steps in good repair, well lighted, and free of children's toys or other objects.

b. Games and Sports. --Keep equipment in safe condition; play games according to rules; keep children off roads and streets.

c. Garages. --Never warm up engine in a closed garage. See that wheels are blocked before getting under a car. Use blocks under car when using jack.

d. Lawn and Garden Tools. --Do not leave tools lying about. Never leave sharp edges turned up. Store tools in a rack off the floor. Be sure of footing while using power lawn mower. Rotary-type mowers are particularly dangerous to operate.



4.33(2)e.

4.33 (2) e. Cesspools, Cisterns, and Wells.--Keep covered with strong cover. Let experts do the cleaning. If abandoned, fill in to ground level.

f. Clotheslines.--Do not keep low lines out overnight.

g. Snow and Icicles.--Remove overhanging snow and icicles from above doors, windows, and walks.

(3) Hobbies:

a. Firearms.--Store locked up and unloaded, breech open, away from children. Treat all guns as if loaded. Be sure barrel is clear before firing.

(4) Trips:

a. Family members shall be trained to drive defensively at all times. See 2.11 Car Travel--General.

CHAPTER 5

PROJECT WORK

LEGEND

CAPITALIZED TEXT--somebody was killed
by not observing these practices.

SHALL--denotes a mandatory requirement.
The SHALL's are capitalized for easy
reference.

SHOULD--denotes a recommended practice.

**It is the duty of each of us
to prevent accidents - and to
protect himself and others
from injury**



CHAPTER 5. PROJECT WORK

CONTENTS

SUBJECT	Page
5.1 FIREARMS	
General	125
Project Work	125
Use of Firearms.....	126
5.2 FOREST PROJECT WORK	
General	129
Tree Felling	129
Blister Rust Eradication ...	132
Girdling and Thinning	134
Pruning.....	135
Hand Planting	135
Machine Planting	136
Tree Poisoning.....	138
Tree Climbing	138
5.3 SALES AND SCALING	
Timber Sales.....	141
Scaling-General	142
Scaling on Land	143
Scaling on Water	145
5.4 ROADS AND TRAILS	
General	147
Roads	147
Trails.....	148
Slides and Mud Flows	149
5.5 CRUISING AND SURVEYING	
General	151
Mineral Surveys.....	152
Snow Surveys.....	153
5.6 FENCING	
General	155
Handling Wire.....	155
Stretching Wire	156
5.7 WOOD PRESERVING	
Burn Prevention.....	159
Operations.....	160
5.8 RADIOACTIVE WORK	
General	161
References	161



5.1 FIREARMS

5.11 GENERAL

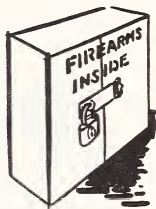
(1) Firearms SHALL be permitted on the job or in camp only after obtaining permission from a responsible forest officer.

(2) All Federal, State, and local laws SHALL be observed.

(3) Firearms and ammunition SHALL be kept in a safe place when not in use, preferably locked up.

(4) Firearms SHALL always be treated as if they were loaded.

(5) Horseplay SHALL be avoided when handling firearms.



5.12 PROJECT WORK

(1) During hunting season--

a. Signs SHALL be posted to warn hunters of crew locations.

b. All employees working in hunting areas SHALL wear yellow markers.

c. Crews SHALL be placed outside of hunter concentration areas if possible.



5.12(1)d.

5.12 (1) d. Crews SHALL assign a lookout to warn hunters where practicable.

(2) In brown or grizzly bear country in Alaska--

a. Each crew SHALL have one man who is familiar with local conditions and is an expert shot. He SHALL carry a dependable rifle, 30.06 or equivalent, with sufficient soft-nosed ammunition.

b. The rifleman SHALL sight-in the rifle at the beginning of the season before going into the woods and be responsible for maintaining it in good condition.

c. No one should be allowed to go on long trips into the woods unarmed or alone.

d. No one SHALL be allowed to shoot at wildlife unnecessarily, especially bear.



5.13 USE OF FIREARMS

(1) Weapons SHALL be unloaded at all times in buildings, in vehicles, on horseback, and when not in use. The safest weapon has the action open.

(2) Weapons SHALL have the firing chamber empty in company with other persons and groups and in other nonemergency situations.

(3) While awaiting turns at target practice, the firing chambers SHALL be empty and the action open. Weapon SHALL be loaded just before firing.



(4) There SHALL be no target practice where there is danger from ricocheting bullets.

(5) Safety devices SHALL be kept in perfect working order.

(6) Ammunition recommended by manufacturer SHALL be used. A competent gunsmith SHALL be consulted on proper ammunition to use in foreign guns.

(7) A man carrying a loaded firearm SHALL not climb a tree or fence. Before going through a fence, he SHALL put the gun through and lay it on the ground, pointing away from him.

(8) When stalking game or in other situations when gun must be loaded, men SHALL use safety catch at all times and point the weapon at the ground in front.

(9) Firearm SHALL be pointed only at those things you intend to shoot.

(10) Be sure no one is in your line of fire.

(11) Do not shoot at any sound or movement in the brush.

(12) Before loading firing chamber, make sure that there are no obstructions in the gun barrel.







5.2 FOREST PROJECT WORK

5.21 GENERAL

(1) Each new employee SHALL be given thorough instruction in work hazards, job skills, safe use of hand and power tools, and woodsmanship.

(2) Safe work clothing and protective devices SHALL be worn as conditions warrant it. See 7.3, Safety Equipment.

(3) Safe operating plans SHALL be developed for new mechanized equipment before assignment to a crew.

(4) Before starting any woods operation, ground cover, vines, and branches that will interfere with tool swing operation or good footing SHALL be removed.



5.22 TREE FELLING

(1) The job SHALL be planned in advance:

a. Before felling, an experienced man SHALL check for--

1. Species.
2. Size.
3. Soundness.
4. Dead Limbs.



5.22(1)a. 5.

- 5.22 (1) a. 5. Burning top and bark.
6. Topheaviness.
7. Direction of lean.
8. Nearby hazards--trees, people.
9. Slope of ground.
10. Direction and wind velocity.
11. Position of standing or down timber that might deflect tree.

b. Tree fellers SHALL select a cleared escape route before starting the cut. Practice drills are recommended.

1. If possible, stand behind another tree behind the tree being felled.

2. Be sure to get clear of the butt.

3. Look up and watch for falling branches; continue to watch until all broken branches have fallen, especially those that may be thrown back by an adjacent tree or snag brushed by the falling tree.

4. Usually the quadrant opposite the fall of the tree is the safest location.

c. Fellers SHALL be so placed that there is no danger to nearby workers; preferably all SHALL work on the same contour, rather than some working above others on steep hillsides.

d. One man SHALL be stationed to watch for falling limbs or tops in dangerous situations.

e. Flagmen SHALL be stationed when felling is planned across or alongside any traveled route, unless road or trail can be effectively blocked and signed.



(2) Before felling any tree or snag, enough space SHALL be cleared around the base and overhead to make plenty of working room and to provide for escape in emergencies. Firm footing SHALL be provided.

(3) For a heavily leaning tree, a deep undercut with side cuts SHALL be made. Next cut corners of backcut, then cut squarely across to prevent splitting or barberchair.

(4) Wood holding in partially rotted trees SHALL not be trusted.



(5) Once started, the felling SHALL be finished before the crew leaves the job for lunch or at the end of the day.

(6) If a push pole is used, it SHALL be held against your shoulder.

(7) Just before tree starts to fall, "TIMBER" SHALL be shouted or a noise device used by hand or power felling crew, so those nearby will have time to get in the clear.



(8) Employees SHALL watch out for other trees which may fall in an undetermined direction when hit by a falling tree.

(9) A lodged tree SHALL never be climbed. It SHALL be handspiked or pulled down by a horse, tractor, or truck, and a chain, or by felling another



5.22(9)

tree upon it, rather than by cutting the tree in which it is lodged.

(10) When topping or limbing, be careful if tree is held off the ground by one of its branches.

(11) Cutters should stand on side of tree opposite the branches they are cutting, where practicable.

(12) A sapling or branch that is bound down SHALL be cut from beneath with an ax or brush hook.

(13) When trees on sloping ground are bucked, blocking or other devices SHALL be used to prevent rolling or sliding. If only one man is sawing, he SHALL work from the uphill side.

(14) Choker setter should check for snakes before placing choker around a log in snake country.

5.23 BLISTER RUST ERADICATION

(1) Workers SHALL wear--

a. Logger-type shoes with nonskid soles, such as boot calks, hob-nail, or composition soles, depending on local requirements.

b. Puncture-, tear-, and snag-resistant trousers without cuffs.

c. Tear-resistant shirts, especially in brush areas.



d. Leather-faced gloves.

(2) Safety spectacles or screens should be worn for protection against branches hitting the eyes.

(3) Workers SHALL be guided to and from their work. They SHALL not work alone until leader is sure they are qualified to do so.

(4) Checkers and other personnel who work independently SHALL leave word on their schedule, route, and destination.

(5) Workers SHALL be trained to pull ribs so as to avoid back strains.

a. Crouch down, with feet about 12 inches apart, shoulders over hips, and back straight. Grasp ribs near base of plant, pull with short, steady jerks, making use of the strong leg muscles.

b. If bush does not come out easily, grub it out, swinging tool away from legs and feet.



(6) Men SHALL not work above each other where there is danger from rolling rocks or logs.

(7) These precautions SHALL be followed:

a. Remove oily clothes immediately at the close of the work day; bathe; and put on clean, fresh clothes. Wash work clothes frequently.

b. If a worker shows signs of being allergic to the spray solution, transfer him to different work.



5.24

5.24 GIRDLING AND THINNING

(1) Safety goggles and gloves SHALL be worn by power girdle operators.

(2) Operator SHALL watch the girdling head while operating.

(3) Operator SHALL be relieved frequently.

(4) Girdler SHALL not be transported with motor operating.

(5) Thinning crew members SHALL work at least 1 1/2 times the height away from trees being felled by others.

5.25 PRUNING

(1) Pole pruners SHALL be carried in hand, with saw ahead.

(2) Workers in the pruning crew SHALL work at least 1 1/2 pole lengths apart and should wear gloves.

(3) Limbs SHALL be struck with pruning club from upper side only.

(4) Pruners SHALL check to be sure that there is no danger of falling limbs striking other men. Employees SHALL not stand directly under limbs being pruned.

(5) Tools SHALL be placed on the ground where workers will not trip or fall on them. Pruning saw SHALL have cutting edges protected when not in use.



(6) At least 3/8-inch diameter Manila rope SHALL be used for climbing operations. It SHALL be inspected daily before use for cuts, wear, strains, or breaks.

(7) Inexperienced men SHALL be limited to heights of 15 feet until they have demonstrated their ability to work and climb safely. Any workman who does not adapt himself to climbing or is subject to dizziness SHALL be assigned other work immediately.

(8) Safety rope SHALL be kept above waistline when climbing either up or down, and SHALL not be damaged with club or pruning saw.

(9) Safety rope SHALL be kept around large trees when ascending, working, and descending, and on small trees while working.

(10) Both hands SHALL be kept on safety rope while climbing or descending.

5.26 HAND PLANTING

(1) All crew members SHALL wear suitable rainproof or weather-proof clothing when needed.

(2) Crews using planting tools SHALL be trained to--

a. Be sure footing is firm before swinging.

b. Stand and swing in such a way that planting tools will not strike toes, feet, or legs.



5.26(2)c.

5.26 (2) c. Look carefully before striking, to avoid having the tool glance.

(3) When planting on steep ground--

a. All crew members SHALL wear nonskid boots.

b. Workers SHALL not work on downhill side directly below another worker.

c. All crew members SHALL be trained to avoid the dangers of rolling logs, rocks, chunks, etc., by--

1. Working in staggered lines, ever alert to danger.

2. Avoiding precariously balanced logs, chunks, and rocks. These SHALL be stabilized where practicable or tagged in advance of planting.

(4) Worker SHALL be instructed on how to avoid snag or tree dangers, danger to eyes from flying dirt, twigs, or rock chips. When strong winds or other weather conditions make work hazardous, crew SHALL be removed to a safe area or returned to camp.

5.27 MACHINE PLANTING

(1) Machine SHALL be provided with foot guards that completely cover the bottom and sides of the feet. These guards should be checked frequently for any signs of breakage or other damage.

(2) A heavy screen guard SHALL be attached to the planter, to protect the operator when planting is being done in heavy brush. The rear should be unguarded so the operator can get out quickly in an emergency.



(3) If planting is being done in rough terrain, or in areas of logs or heavy brush, the machine that pulls the planter SHALL be equipped with a blade such as a V-shaped blade or angle dozer.

(4) A signal device such as a buzzer or rope pull SHALL be provided for the machine operator and the tractor driver. The signal for a stop SHALL be definitely understood by both operators. Or a device may be installed on the planting machine to allow the machine operator to disengage the master clutch on the tractor or to release the planting machine from the tractor in case of emergency.

(5) Operators SHALL wear close-fitting clothing, hard hats, and goggles or other adequate eye protection if the machine is not adequately screened for this purpose.

(6) Operators SHALL watch for sticks, logs, or brush that may poke up through openings in the machine.

(7) The power unit drawing the planting machine SHALL be confined to limited degree turns to prevent tipping over the planting machine.

(8) All tractors SHALL be equipped with upright exhaust pipes to direct exhaust gases away from tractor and planting machine operators.

(9) All tractor planting machine outfits SHALL be equipped with first aid kit (snake bite kit where appropriate), shovel, ax, and fire extinguisher. A rear-view mirror should be mounted on the tractor.



5.28 TREE POISONING

(1) Safety goggles, respirators, and protective lotions SHALL be used as needed.

(2) No smoking or fire SHALL be allowed near solutions with flammable base.

(3) Chemicals SHALL be applied to windward.

(4) See also 8.3 Laboratories and Chemicals.

5.29 TREE CLIMBING

(1) Qualifications:

a. Climber SHALL be trained in tree felling and climbing before he is trained in tree topping. No one who has undue fear of heights SHALL climb a tree.

b. Climber SHALL be trained and supervised by qualified climber or topper until proficient.

c. Climber and groundmen SHALL be proficient in guying and rigging. They should know how to tie and when to use timber hitch, bowline, sheep shank, rolling hitch, and square knot.

d. Groundman should be able to climb.

(2) Safety precautions:

a. Trees SHALL be checked for soundness, loose bark, rot, etc.

b. All equipment SHALL be checked daily.

c. Weather conditions SHALL be favorable--not wet or too cold, no ice on trees, wind not gusty or strong.

d. Climber and groundmen SHALL work as a team.

e. Safety strap or rope SHALL be fastened at all times when at work.

f. Safety belts or climbing rope SHALL be used at all times when ascending or descending except when not practicable because tree is small or has too many branches.

g. In topping trees, heavy branches that might change the fall of the top SHALL be removed first.

h. Do not top out more than can be handled safely.

i. Check the area in which the top will land.

j. Cut the corners on sides of undercut to prevent splitting.







5.3 SALES AND SCALING

5.31 TIMBER SALES

(1) Vehicles SHALL be parked out of the way of trucks, other equipment, and logs.

(2) Employees SHALL--

a. Stay away from the sides of loaded log trucks until after log chains have been tightened.

b. Keep well away from moving equipment and make sure the equipment operators see you before you walk up to the equipment.

c. Unless otherwise specifically instructed, keep off logging and roadbuilding equipment.

d. NOTIFY THE LOGGERS
WHEN YOU ARE WORKING IN A
CUTTING AREA.

e. Be alert for falling trees, snags, widow-makers, and rolling logs.

f. Never stand on a bucked tree that will be hit by a tree being felled--it may not be bucked through.

g. Never walk below an active cat road where there is danger of a loose log rolling over you.

h. Never stand in the bight of the line, particularly at tail block corners on a hi-lead setting.

i. Never cross under an active mainline or haul-back line on a hi-lead setting.



5.31(2)j.

5.31 (2) j. Stay off cold decks if possible; if you must go on them, be cautious of rolling logs.

k. Stay out of range of small uncut trees sometimes pushed over by log movement.

(3) When working in advance of road construction, employees SHALL always find out from the man in charge of the powder crew when he expects to shoot and tell him the expected time of return to the road location. Always sound off when nearing the powder crew's working area.

(4) No work SHALL be done in timber sale areas during period of high winds or immediately after windstorms. If caught in the woods during a heavy windstorm, get into a natural opening large enough to give protection from windthrow and falling limbs or find a sheltered draw. Stay away from wooded marshy areas and recently partial-cut areas.



5.32 SCALING--GENERAL

(1) Because of differences in the lay of the ground and the wide variation in the equipment used by different operators, no two operations are exactly the same. Each scaler SHALL be guided by these rules, and SHALL continue to watch for any additional hazards that may be peculiar to some jobs.

(2) All scalers SHALL be instructed in the job hazards beforehand.

(3) Scaler SHALL--

a. Wear clothing and footgear suited to the country and the work. Shoe heels should be low, soles should be calked or composition, according to the footing where he works; trousers cuffless. Hard hat SHALL be worn in the woods and at landings.

b. Have an understanding with the operator as to where and when logs are to be scaled.

c. LET ALL WOODS WORKERS KNOW WHERE HE IS WORKING, BUT NOT DEPEND ON THEM FOR SAFETY.

d. Move to a safe place as soon as scaling is completed. Extensions in the scale book SHALL be made after moving to a safe place.



5.33 SCALING ON LAND

(1) Depending on the landing and the methods used, the safest work can often be done by scaling each turn of logs just outside of the landing, before chokers are unhooked. If arches are used, operators SHALL be instructed to drop their loads for scaling and not move them until the scaling is completed.

(2) When scaling at landings scalers SHALL--

a. Stay clear of each turn of logs until the chokers are clear, the cat or other skidding equipment is out of the way, and the logs have stopped rolling and sliding. They should not scale on landings where logs are being moved if there is danger of roll or slippage.



5.33(2)b.

5.33 (2) b. Keep away from running lines, moving chokers, swinging logs and rigging, and jammers or cranes in operation.

c. Never walk between truck and brow log or loading platform.

d. Stay clear of the loaded truck as it leaves the landing.

e. Choose a safe and convenient place to stand when not actually engaged in scaling. This is usually toward the front of the landing and away from turnarounds, swinging lines, and logs rolling from the deck.

(3) When scaling on cars or trucks, scalers SHALL--

a. SCALE ON CARS OR TRUCKS ONLY AFTER THE LOAD IS BOUND BY CHAINS OR CABLES, AND NEVER UNDER THE LOADER.

b. Scale only while loaded truck or car is stopped and brakes set.

c. Use scaling ramp or platform whenever possible.

d. Use a ladder or steps to climb to top of load if you are not scaling from platform or ramp.

e. Watch for unguarded exhaust stacks on trucks.



(4) Scalers SHALL not--

a. Walk between logs on mill decks or landings where roll is possible, especially on sloping ground.

b. Engage in horseplay at the landing.

c. Speed up loading by taking chances in scaling.

5.34 SCALING ON WATER

(1) Anyone scaling on water SHALL be able to swim and be in satisfactory physical condition. Otherwise, scaler SHALL not work alone.

(2) A lifejacket or lifebelt SHALL be worn. The carbon-dioxide type that automatically inflates, like the "Hasco Airfloat," is approved.

(3) Footwear with sharp calks SHALL be worn.

(4) Only logs satisfactorily rafted, boomed, or otherwise controlled SHALL be scaled.

(5) Scaling periods should be arranged to avoid the necessity of scaling when--

- a. There are high winds, current, and tides.
- b. Logs are covered with ice or snow.
- c. Rafts are being towed.
- d. Scaler will be excessively isolated for long periods of time and is scaling alone.







5.4 ROADS AND TRAILS

5.41 GENERAL

(1) Projects SHALL be started only after analyzing the accident potentials and making plans to meet the hazards.

a. Special instructions SHALL be prepared for situations not covered in the Health and Safety Code or the Transportation System Improvement Handbook.

b. Foremen SHALL not allow men to work under unsafe conditions.

c. Plans SHALL include measures to insure public safety.



(2) Barricades and danger, detour, and warning signs SHALL be erected and maintained. Red lights and watchman service SHALL be used if traffic warrants it or if there are hazards to the public, such as landslides, washouts, bridge replacements, equipment use, and stock piling.



(3) See also Divisions 2 and 3, Transportation System Improvement Handbook.

5.42 ROADS

(1) A primary function is to keep the road as safe as possible. Minimum requirements of road maintenance SHALL include--



5.42(1)a.

5.42 (1) a. Removing from upper road banks those trees or large rocks that may be expected to fall within the next 5 years.

b. Removing all down logs hanging over the upper road bank.

c. Repairing undercut roads, to prevent cave-in.

d. Keeping brush back to provide adequate sight distance.

e. Replacing all damaged warning and caution signs and reflectors for bridges.



5.43 TRAILS

(1) Trail crew safety is especially important because these men work in isolated areas where outside help is not readily available in emergencies. Foremen and workers SHALL guard against these trail injury sources: unskilled use of hand tools; use of stock; falling trees, branches, logs, and rocks; falls because of poor footing or tripping; lifting; and eye injuries from branches, chips, dust.

(2) Trail crew workers SHALL be selected for their good safety attitude as well as their physical fitness for work in back country, and preferably should be experienced in working and living under primitive conditions.



(3) The trail crew safety plan SHALL include--

a. Job hazard survey.

b. Check on knowledge and application of Health and Safety Code.

- c. Provision for first aid.
- d. Thorough safety training.
- e. Prevention of recurrence of similar injuries.

(4) Where livestock is used, at least one member of the crew SHALL be experienced and SHALL demonstrate that he is capable of handling livestock under emergency situations.



(5) Trail crew foremen SHALL be fully qualified in first aid. Crews SHALL have adequate first aid equipment for any emergency and SHALL be thoroughly briefed on how to handle serious accident situations.



(6) Special written safety instructions SHALL be prepared for those operating power maintenance equipment such as scooters and duffle carriers. Generally this type of equipment can be most safely handled by men under 40.

(7) Trail crew foremen SHALL --

- a. Be alert to spot and correct unsafe work practices and conditions.
- b. Insist on safety on the job always.
- c. Have basic knowledge of first aid.

5.44 SLIDES AND MUD FLOWS

(1) A watchman SHALL be designated and placed in a safe position where he has the fullest view of the hazard area involved and where his warnings can be heard by all other members of the crew.



5.44(2)

5.44 (2) Escape routes SHALL be determined in advance.

(3) As few as possible employees SHALL be exposed to the hazard.

(4) All Government-owned tools and equipment not needed in the operation SHALL be located a safe distance beyond the area exposed to danger.

(5) DURING EXTREMELY HAZARDOUS CONDITIONS, SUCH AS IN HEAVY RAINFALLS OR HIGH WINDS IN STEEP COUNTRY WITH UNSTABLE SOILS, CREWS SHALL BE KEPT AWAY UNTIL CONDITIONS ARE MORE NORMAL, IF POSSIBLE.



5.5 CRUISING AND SURVEYING

5.51 GENERAL

(1) Work SHALL not be done in timber when high winds are blowing and blowdown is likely to occur.

(2) Calked or composition shoes SHALL be worn in down timber or in rough country.

(3) Extended chain or tape SHALL not be handled during an electrical storm.

(4) Caution SHALL be used when handling chain or tape near power and telephone lines.

(5) Workers SHALL be especially careful when walking along swamped survey lines having protruding, sharp stubs.

(6) Inexperienced crews should be kept together in traveling to and from work.

(7) One arm and one hand should be free of equipment when walking on logs or over dangerous places.

(8) Pruners or brush hooks rather than axes should be used for clearing light brush and willows.

(9) Flagmen and signs SHALL be used when surveying in traffic.



5. 52 MINERAL SURVEYS

(1) Employees SHALL not enter underground mining claim workings or deep cuts if a qualified Forest Service mineral examiner says they are not safe.

(2) Before a mineral examiner goes into the workings, he SHALL be sure that his safety equipment is in perfect order and is suited to the job. His equipment SHALL always include a hard hat; for underground workings an adequate light, auxiliary light, and candles for testing bad air. A first aid kit SHALL be readily available.



(3) Employees inexperienced in mining SHALL examine underground mining claim workings or deep cuts only when accompanied by a qualified miner, mine inspector, or mineral examiner.

(4) No examiner SHALL enter underground workings or deep pits unless his whereabouts and expected time of return are known to a responsible Forest Officer.

(5) An examiner SHALL not enter dangerous workings alone; he SHALL be accompanied by a helper. He SHALL especially instruct and post his helper at a strategic point, at the mouth or portal of a tunnel or shaft, or within workings where safe, and from which best rescue efforts can be carried on.



(6) Whenever nonflammable gases are suspected, the inspector, examiner, or helper SHALL use a

candle to test the underground air for oxygen before the examiner enters tunnels or shafts.

(7) Open-flame lamps, candles, or matches SHALL not be used or carried in mines that might have flammable gas. Entry into such mines SHALL be made only with an experienced, properly equipped mine inspector.

5.53 SNOW SURVEYS

(1) No man SHALL go on snow survey work alone except where no unusual hazard is involved, such as a snow course a few steps from a main traveled highway.

(2) No one who is physically below par SHALL undertake a snow survey trip.

(3) Surveyors SHALL be equipped and clothed for this type of travel, and skilled in--

- a. Using snowshoes or skis safely.
- b. Specialized first aid applicable to snow travel.
- c. Avalanche hazard prediction.

(4) The easiest and safest routes of travel SHALL be selected, avoiding travel through areas of known snowslide or avalanche hazard.

(5) Work plans should be flexible enough to utilize the safest days for travel, considering storms and snow travel conditions.



5.53(6)

5.53 (6) Snow courses SHALL be rerouted if unusual hazards are found, such as deep snow under a power line, or if no reasonably safe approach route is available.

(7) Long or extrahazardous over-snow trips SHALL be made as safe as possible by prearrangement. Emergency shelter and stores should be provided if there is a possibility that the party will need to stay out overnight. Careful arrangements SHALL be made to insure that a responsible person knows the route of travel being taken and is informed when parties leave and return.



5.6 FENCING

5.61 GENERAL

(1) Heavy gauntlet-type gloves SHALL be worn for work with barbed wire. The wearing of a heavy leather apron is optional.

(2) Posts SHALL be laid up and down slope to prevent rolling.

(3) On fence work where the wire is being installed, work SHALL be stopped and workers SHALL get away from fence when lightning storms are in progress. See 3.4 Lightning.

(4) Before crawling under a fence, the objects being carried SHALL be placed on the other side.



5.62 HANDLING WIRE

(1) End of wire SHALL be firmly secured when wire is unrolled from spool. Side guards on spool roller SHALL be used to prevent side lash. Spool SHALL be kept level while unrolling wire.



(2) Wire SHALL be secured on both sides of pliers to prevent backlash when cutting from a roll of wire under tension.



5. 62(3)

5. 62 (3) Arm SHALL not be placed over or under line wire to steady post while driving staple.

(4) Staples SHALL not be driven too deeply, as wire can easily be severed, with chance of injury to workers along line.



(5) Smooth wire SHALL be used to make gatepost loops where wire gates are used in fence. Top gate wire should be smooth in the panel next to closing device. Wood lever with smooth wire should be installed for closing gate.

(6) On projects where metal posts are used, a commercial post driver should be used, or a driver should be made of a pipe that will slide over the post. The pipe should be about 42 inches long, weigh about 15 pounds, and have one end closed by welding.

5. 63 STRETCHING WIRE

(1) Kinks SHALL be removed and straightened before wire is stretched.

(2) Old wire SHALL be checked for weak spots and splices before stretching.

(3) Stretchers of heavy construction with ropes not smaller than 1/2 inch SHALL be used.

a. Worn ropes and wire clamps SHALL be replaced at regular intervals.

b. Machine power SHALL not be used to stretch wire.

(4) All workmen SHALL stay in the clear of wire while it is being stretched.



(5) Not more than 1/4 mile of wire SHALL be stretched at one time. In rough country, limit span of stretch between another post and stretcher to distance that can be seen. Old wire SHALL never be stretched long distances.

(6) Top wire SHALL be stretched first.

(7) When stretching wire on sidehills, spool SHALL be secure, with no chance of rolling onto workers.

(8) When stretching wire, visual signals SHALL be used when there is any doubt about hearing verbal signals because of distance, wind, or other obstacles.



(9) Wire SHALL not be stretched to breaking point.

(10) Hammer, pliers, or stick SHALL be used to hold wire in place while attaching weights, stapling, or releasing from obstacles.

(11) Pliers or a stick SHALL be used to pull down wire that is stretched across a depression, or to release it from obstacles.



(12) When releasing wire from obstacles, employees SHALL stay on side of post opposite from wire.







5.7 WOOD PRESERVING

5.71 BURN PREVENTION

(1) Shirt sleeves SHALL be rolled down.

(2) Gloves that creosote cannot penetrate SHALL be worn.

(3) Neck SHALL be covered by turning up collar or wearing handkerchief.

(4) Trouser legs SHALL be rolled down over the ankles and boot tops.

(5) Exposed portions of skin SHALL be covered with protective creams or yellow vaseline.

(6) Sunburn lotion and sunglasses should be used for protection from creosote reflection on bright days.

(7) Hands and face SHALL be washed thoroughly with soap and hot water immediately after work. Grease SHALL be removed.

(8) Hands or articles of clothing that have creosote on them SHALL be kept away from eyes.

(9) Employees SHALL change to fresh clothes after workday. Clothes that become soiled with creosote SHALL be laundered frequently.



5.72 OPERATIONS

(1) Workmen with fair skin and light hair should be used where they are not in frequent contact with creosote.

(2) Rubbing alcohol and cotton SHALL be available for washing off creosote.

(3) Precautions SHALL be taken to avoid the addition of water, snow, or very wet posts or poles to hot creosote, to prevent foaming or surging.

(4) A 1-inch air space for expansion of creosote SHALL be left when storing creosote in drums.

(5) Timbers SHALL be piled or removed in tiers; also blocked to prevent rolling.





5.8 RADIOACTIVE WORK

5.81 GENERAL

(1) Whenever radioisotopes are used, the safety measures taken SHALL satisfy the minimum requirements outlined in USDA Administrative Memorandum No. 108.6, Supplement No. 3, 12/15/55. This includes part III, Rules for Use of Radioisotopes; part IV, Rules Affecting Personnel; part V, Laboratory Rules; part VI, Field Experiment Rules; and part VII, Reference Material.

a. A Radiological Safety Officer SHALL be appointed to integrate and evaluate essential safety precautions.



5.82 REFERENCES

(1) These references SHALL be studied by employees planning to work with radioactive materials--

a. Practical Aspects of Surface Decontaminations, Tompkins, Biggell, and Watkins, Nucleonics 7, pp. 42-54, 87 (1950).

b. Some practical Aspects of Radiation Shielding, AEC Isotopes Div. Circular B-4.

c. National Bureau of Standards Handbook 52, Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water.

d. NBS Handbook 53, Recommendations for Disposal of C^{14} Wastes.

e. NBS Handbook 59, Permissible Dose from External Sources of Ionizing Radiation.



CHAPTER 6

CONSTRUCTION AND MAINTENANCE

LEGEND

CAPITALIZED TEXT--somebody was killed
by not observing these practices.

SHALL--denotes a mandatory requirement.
The SHALL's are capitalized for easy
reference.

SHOULD--denotes a recommended practice.

**It is the duty of each of us
to prevent accidents - and to
protect himself and others
from injury**



CHAPTER 6. CONSTRUCTION AND MAINTENANCE

CONTENTS

SUBJECT	Page	SUBJECT	Page
6.1 BLASTING		6.4 EXCAVATION	
General	165	General	199
Handling	166	Trenches--Un-	
Storage	167	stable	201
Transportation ..	170	Trenches--	
Use	174	Hard, Compact	202
Preparation...	174	Bulkheads and	
Loading	176	Retaining Walls	202
Wiring	177	Gravel Pits ...	204
Firing	178	Quarries	205
Misfires	179	6.5 LADDERS AND	
Disposal	181	SCAFFOLDS	
6.2 RADIO AND TELE-		Ladders--Con-	
PHONE		struction	209
Radio	185	Use	210
Telephone Line		Storage	210
C&M General...	186	Scaffolds--Gen.	211
Telephone Line		Horse	213
C&M Equipment	187	Swinging	213
Pole and Tree		Riveting	214
Operations	188	Post and Pole	214
Loading and		Single Pole .	216
Transporting .	188	6.6 RIGGING	
Raising	189	General	219
Climbing	189	Rope	219
Working Aloft .	191	Wire Ropes and	
Limbing	192	Cables	220
Wire Stringing	192	Chains	223
Taking up Wire	193	Chain Block	
6.3 CONCRETE AND		Hoists	224
MASONRY		Hand Hoists ...	224
General	195	Sheaves, Blocks,	
Form Work	195	Pulleys	224
Platforms	196	Gin Poles	225
Runways	196	6.7 WELDING	
Stone and Brick		General	227
Masonry	196	Arc Welding ...	228
Mixers	197	Oxyacetylene	
		Welding	229
		Handling Equip.	230



6.1 BLASTING

6.11 GENERAL

(1) All explosives work SHALL be done only under the direct supervision of a blaster, with a current Blaster's Certificate of Competency, certified as such after passing an examination and field demonstration on handling, storage, and use of explosives. Inexperienced men SHALL be trained by an experienced man.



(2) Only electric detonators SHALL be used for exploding charges, except near power lines 6.15(4), radio installations 6.21(3), and in some avalanche control work. See Avalanche Handbook.

(3) Only explosives listed in the Forest Service acceptable list should be used. See Road Handbook.

(4) All persons using explosives SHALL be familiar with and comply with Federal, State, and local laws.

(5) Company approval SHALL be secured before blasting near a power line. Where possible, current SHALL be shut off during blasting operations.

(6) All persons such as loggers, fishermen, recreationists, or residents in or near blasting areas SHALL be warned about the operation.



6.11(7)

6.11 (7) See also chapter on Explosives in the Road Handbook, and 7.34(1) Hard Hats.

6.12 HANDLING

(1) Explosives SHALL be handled with extreme caution.

(2) Fire and sparks SHALL be kept away from explosives.

(3) Explosives should be handled only during daylight. If light is necessary at other times, use only electric lights. Flashlights should have nonconductive cases and SHALL not touch explosives.

(4) Only wooden wedges and mallets SHALL be used for opening wooden boxes of explosives.

(5) Fiberboard cases can be opened with metallic slitters provided slitter SHALL not touch the metallic fasteners of the case.



(6) Cases SHALL not be opened inside storage magazine.

(7) Cases SHALL be lifted clear and set down carefully. One case SHALL not be allowed to slide over another or be dropped from one level to another.

(8) Explosives SHALL not be left exposed to the direct rays of the sun for longer than 1 hour.

(9) Explosives or wrappers SHALL not be left where children, unauthorized persons, or animals have access to them.

CONST. & MTCE.

BLASTING

(10) Empty cases that have contained deteriorated explosives or powder residue SHALL not be used for any other purpose. See 6.17 Disposal.

(11) A shipment of explosives SHALL be inspected to be sure that it arrived in good condition. If any cases have been broken in transit, proceed with caution to sweep up and destroy all loose explosive and broken debris.

(12) Broken cases SHALL not be repaired.

6.13 STORAGE

(1) The location of permanent magazines SHALL be selected in accordance with the American Table of Distances which states:

*Explosives		Distance in feet when storage is not barricaded		
Pounds over	Pounds not over	Inhab. bldgs.	Rail-ways	High-ways
2	5	140	60	60
10	20	220	90	90
50	75	340	140	140
100	125	400	160	160
200	250	510	210	210
500	600	680	270	270
1,000	1,200	850	340	330
2,000	2,500	1,090	440	360
5,000	6,000	1,460	590	470
10,000	12,000	1,750	740	540
20,000	25,000	2,110	940	630
40,000	45,000	2,680	1,140	800

*Interpolate distances for amounts between those above. Above distances can be reduced 50 percent if screened by natural or artificial barriers.

CONST. & MTCE.

BLASTING

6.13(2)

6.13 (2) Magazines SHALL be bulletproof, fire resistant, and well ventilated, located and constructed in accordance with Regional, State, and Federal requirements. There SHALL be a distance of at least 100 feet between dynamite and detonator houses, and at least equal to $2/3$ of the distance between nearby high tension line towers. See Road Handbook for specifications.

(3) Door SHALL be securely locked at all times when men are not working in magazine.

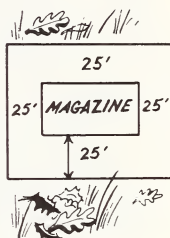
(4) Metal tools SHALL not be used or stored in magazines.

(5) The surrounding area SHALL be kept free of leaves, dead grass, or other flammable material, for a distance of 25 feet.

(6) Cleared area SHALL be conspicuously posted with white warning signs reading "DANGER--EXPLOSIVES" in red letters not less than 4 inches high. See 8.14(1) Safety Signs.

(7) Electric detonators SHALL be stored in a separate magazine from other explosives.

(8) Magazine floors SHALL be swept regularly during use and magazines SHALL be kept clean at all times. If



magazine floors become stained with nitroglycerine or before starting repairs to floors, they SHALL be scrubbed well with this solution--

- 1 1/2 quarts of water
- 3 1/2 quarts of denatured alcohol
- 1 quart of acetone
- 1 pound of 60 percent commercial sodium sulfide.

Disolve the sodium sulfide in the water before adding the alcohol and acetone. Use plenty of the cleaning solution to thoroughly decompose the nitroglycerin. Scrub well with a stiff broom or brush.



(9) Explosives SHALL be stored at least 4 inches from walls for ventilation, with top side up so that cartridges will not be on end. It is not necessary to turn explosives boxes in storage.

(10) Different grades of explosives SHALL be stored in different piles so that brand and grade can be plainly seen without shifting piles. Oldest stock SHALL be placed so that it will be available for earliest use, within 6 months if possible. Opened cases should be used promptly.

(11) Explosives used on jobs that can be reached by trucks SHALL be stored in temporary explosives and detonator magazines, constructed according to specifications in Road Handbook, p. 447, or in Dupont Blaster's Handbook.

(12) Temporary magazines SHALL consist of--
a. Box, of double wall construction, with a 5-inch sandfilled space on all sides and a heavy double board lid not less than 2 inches thick. Exterior of



6. 13(12)a.

magazine and lid SHALL be covered with not less than 24-gage iron. Or--

b. Two-inch plank box covered with a heavy double board lid not less than 2 inches thick. Exterior of magazine and lid SHALL be covered with 16-gage or heavier flat iron.

c. Magazine lid SHALL be hinged, hasped, and provided with a substantial lock.

(13) Temporary magazines or daily supplies SHALL be posted and located under or behind natural or artificial barriers such as heavy timber ridges, or embankments.



(14) On small jobs, such as trails in the back country where explosives are transported by pack train, explosives and detonators SHALL be stored separately behind natural or prepared bulletproof barriers. They should be protected from the weather by waterproofed canvas if possible. Storage area SHALL be cleared and posted as outlined in 6. 13(5), (6).

(15) All explosives SHALL be stored in permanent or temporary magazines.

6. 14 TRANSPORTATION

(1) Trucks used for transporting explosives including detonators SHALL have signs "EXPLOSIVES" in red letters not less than 4 inches high on front and rear ends and both sides, in addition to two red flags on the front.



(2) Trucks SHALL be of ample size for the load and in first-class operating condition, preferably of

CONST. & MTCE.

BLASTING

the closed-body type. Open trucks may be used only if the explosives are protected with waterproof and, if possible, fireproof tarpaulin. Trucks SHALL carry reflector signs or electric flares.

(3) Packages of explosives showing stain from interior leakage SHALL not be hauled in any vehicle.

(4) Truck SHALL be provided with two pressure powder-type or CO₂ fire extinguishers. These SHALL be tested frequently, depending on the number of trips made. See 3.28(1), (2).



(5) Trucks SHALL have sides high enough to prevent packages from falling off.

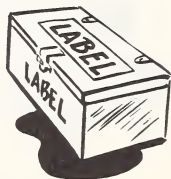
(6) Trucks should have wooden floors. Any metal in body likely to come in contact with cases SHALL be covered with wood or waterproof canvas.

(7) Detonators SHALL be transported with other explosives in same vehicle or by the same man only under these conditions specially authorized by Regional Foresters:

a. Not more than 1 day's supply SHALL be so moved.

b. Dynamite SHALL be carried in the back of truck or pickup, detonators in the cab on the floor.

c. Detonators SHALL be carried in original container, in a box made of 2-inch lumber lined with 1/2 inch of padding, or in a box made of not less than 16-gage sheet metal



6. 14(7)c.

lined with wood not less than 3/8 inch thick so no metal is exposed inside. Hinged cover, fastener, and label SHALL be required.

(8) Detonators SHALL not be carried in a vehicle equipped with a 2-way radio, unless they are in a 16-gage iron box as specified in 6. 14(7)c.



(9) Unboxed metal tools, firearms, cartridges, acids, flammable substances, storage batteries, chemicals, or corrosive materials SHALL not be carried in same truck body with explosives.

(10) Trailers SHALL not be attached to trucks transporting explosives or used to haul explosives.

(11) Loads SHALL not exceed the rated capacity of the vehicle.

(12) The driver of a truck used for transporting explosives SHALL--

- a. Be careful, capable, and reliable.
- b. Be able to read, write, and understand the English language.
- c. Be familiar with and comply with the rules of the road and State and local regulations regarding the transportation of explosives.
- d. Stop, look, and listen before attempting to cross any railroad tracks.
- e. Avoid unnecessary stops.
- f. Stop outside town for meals, preferably at a roadside restaurant, and park the truck as far as possible from traffic and parked vehicles. Driver SHALL never get out of truck or car



CONST. & MTCE.

BLASTING

without first stopping engine, setting brakes, and setting gearshift lever in low or reverse.

g. Avoid having truck repaired during trips. In emergencies, repairs SHALL be made only in the open air.

h. STOP the truck engine before putting gasoline in the tank.

(13) Driver SHALL not--

a. Smoke while driving the truck.

b. Carry firearms or loaded cartridges while driving.

c. Permit unauthorized persons to ride on the truck.

d. Coast downhill out of gear.

e. Leave truck containing explosives unguarded.

(14) Animal transportation SHALL provide for--

a. Detonators and dynamite on separate animals.

b. Detonators in original containers, well wrapped and padded, and packed with nonmetallic articles such as bed rolls and tents.

c. Dynamite mantied and roped.

d. Signing is not necessary in a pack string.

(15) Trail cargo carriers transporting explosives SHALL provide for--

a. Displaying one "EXPLOSIVES" sign prominently, with red letters not less than 4 inches high.

b. A load of explosives only, not exceeding 400 pounds. Explosives SHALL be covered on four sides by fire-resistant tarpaulin and hauled in original container.



6.14(15)c.

6.14 (15) c. One pressure-type dry powder or CO₂ fire extinguisher.

d. Not carrying detonators in the cargo carrier.

e. Carrying not to exceed 50 pounds of explosives in a mixed load, comprised of gasoline, tools, etc. When transported in a mixed load, the dynamite SHALL be packed in a metal box with sponge rubber lining and a hinged lid and hasp for locking. Provision SHALL be made for confining the powder in the box to prevent movement. The box SHALL be painted red and the word "EXPLOSIVES" SHALL be stenciled on top in 2-inch white letters. The box SHALL be carried in the bottom and at the front of the carrier, away from the engine.

f. Removing explosives from the carrier on all overnight stops and storing them in an area naturally barricaded from the camping area.

6.15 USE

(1) A sign--"CAUTION--BLASTING AHEAD, TURN OFF RADIO TRANSMITTERS"--or one with similar wording, SHALL be posted on all roads and trails leading to any active blasting operations. These signs should be not closer than 700 feet from the blasting, and usually not farther than 1,000 feet.



(2) Preparation:

a. When preparing primers of a half cartridge, the cartridge SHALL be cut in half first and then each half SHALL be primed separately.

b. Primers SHALL be prepared for loading each hole or series of holes, as needed.

c. Primers SHALL not be prepared or stored in a magazine, or carried over to the next day.

CONST. & MTCE.

BLASTING

d. Loose electric detonators SHALL not be carried in pockets of clothing or in the same container with dynamite.

e. Where practicable, the blasting machine SHALL be kept in a moistureproof, locked box and removed only when used. Where this cannot be done, machine SHALL be in a locked box overnight.

1. On the job, the blaster SHALL remove the handle of 10-hole machine, and always keep larger ones locked when not in use.

2. The machine SHALL be tested at the start of the project against a rheostat to see if the full electric energy is developed.

3. It SHALL fire without failure at least two times in succession two electric detonators in series, through resistance as follows:

32 ohms for 10-cap machines

144 ohms for 30-cap machines

208 ohms for 50-cap machines

or tested with standard rheostat reading in caps.

4. The safe capacity SHALL be noted on a tag placed on the inside cover of box.

f. If available, a wiring diagram SHALL be kept with the rheostat.

(3) Electric detonators within 300 feet of any 2-way radio transmitter SHALL be tightly enclosed in a metal-encased box. Can SHALL not be opened when transmitter is in use. See 6.14(8).

(4) In areas of high risk from electricity escaping from power lines or other sources of extraneous electricity, explosive experts SHALL use Primacord in place of wiring, within the range considered hazardous by power company operators; or, fire hazard permitting, use caps and fuse on work actually



under or within 300 feet of an electric transmission line where the current cannot be shut off or within 300 feet of a permanent radio transmitting station when such work has been approved by the operating power or radio broadcasting company.

(5) Loading:

a. Only blunt wooden rods SHALL be used for placing cartridges or tamping stemming material.

b. Cartridges SHALL be slit with a knife so that gentle pressure will expand them to fill this hole by tamping lightly.

c. The last half of stemming material SHALL be tamped firmly in place.

d. Detonator wires SHALL not touch or cross each other any more than necessary.

e. Remember that mud capping and shallow shots throw material farther than deep, heavy shots.

f. Holes SHALL not be loaded during a thunder or dust storm.

1. If holes are loaded and a storm occurs, the danger area SHALL be kept clear and flagmen posted the same as when shots are fired, except that traffic SHALL not be held up unless the road is adjacent to the loaded holes.

2. If holes are loaded but not connected to the lead wire, the detonator wires SHALL be twisted together.

g. If necessary to leave overnight, the ends of the detonator wire SHALL be twisted together, coiled, and covered with dirt.

h. Every hole or surface shot SHALL be marked with a 6-inch red cloth at time of loading.

i. Cloth SHALL be removed when circuit is tested before attaching detonator wire. Where more than one powder man has been loading holes in the same area, all SHALL accompany the blaster to be sure all charges of each powder man are connected in the circuit.

j. The blaster SHALL be the last man to leave the danger area so that he can assure himself that everyone is in a safe location. He SHALL also be held responsible for posting flagmen and warning signs, notifying every person and all traffic in the danger area, and shouting all warning signals.

k. The blaster SHALL wait at least 2 hours before loading a sprung hole. He SHALL feel to be sure it has cooled off from the heat of springing. A hole SHALL not be sprung next to a loaded hole.

(6) Wiring:

a. All rounds SHALL be wired in series, with 20-gage or larger connecting wire. No more shots SHALL be wired in one series than the current-rated capacity of the blasting machine.

b. Only standard covered 16-gage single strand or duplex wire SHALL be used, with no bare joints. Splices SHALL be taped and supported off the ground.

c. After lead wires have been wired into the circuit and all connections are tight and the wire clean, and before they are attached to the blasting machine, the circuit SHALL be checked with a blasting galvanometer to see if it is closed.

d. If the blasting galvanometer test is OK and the shot is ready to be made, the handle of the blasting machine SHALL be vigorously pushed down three or four times to warm up the generator before the lead wires are connected to the machine.

e. Detonators SHALL be kept shorted out by twisting together the bare ends of the wires until ready to connect in series.

f. Only detonators of the same manufacture SHALL be used in the same circuit.



6.15(6)g.

6.15 (6) g. Each detonator SHALL be tested before the primer is prepared--

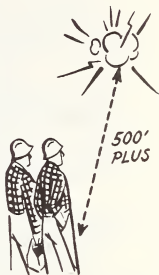
1. Scrape ends of detonator wires clean.
2. Touch them to contact parts of blasting galvanometer.

3. If needle swings across scale, detonator is OK. Each detonator SHALL be tested, as above, immediately after tamping bore hole.

h. Sufficient lead wire SHALL be provided to permit the blaster and crew to be at least 500 feet distant air-line from the nearest shot, unless blast-proof areas are provided at a safe distance from the danger area. Crew SHALL not be allowed to return until blaster has assured himself that there are no misfires or delayed shots.

i. Lead wires and detonator wires SHALL be prevented from contacting any part of a telephone line, transmission line, or other electric installation.

j. The blaster in charge of the shot SHALL connect the wires to the blasting machine.



(7) Firing:

a. VEHICLE AND PEDESTRIAN TRAFFIC APPROACHING THE BLASTING AREA SHALL BE STOPPED ON ROADS AT LEAST 700 FEET AWAY FROM THE BLASTING AREA, AND DRIVERS AND PASSENGERS SHALL BE URGED TO STAND OUTSIDE CARS DURING THE BLAST.



b. A warning cry of "Fire" SHALL be shouted three times by the blaster before each shot, sufficiently in advance to permit all persons to reach a point of safety. He SHALL call "Fire" first after he

CONST. & MTCE.

BLASTING

has checked the round with galvanometer and after the connecting wires are attached to lead wires, second when he reaches the battery end of his lead wire and before he attaches the lead wire to the blasting machine, and third, after he hooks up the lead wires to the blasting machine and just before he fires the charge.



c. The blaster and all employees SHALL face the blast, with backs to the sun if possible, to give the best chance to watch for and avoid flying matter.

d. Immediately after the blast, the lead wires SHALL be disconnected from the machine and the bare ends twisted together, and the machine SHALL be put back in the box until needed. See 6.15 (2)e. The blaster SHALL coil up the lead wires for at least 100 feet as he approaches the blasted area to prevent tampering when he is away from machine.

e. Before work is resumed after a blast, wires SHALL be traced by the blaster through the broken rock, and a search SHALL be made for any unexploded cartridges and misfires.

f. The blaster SHALL give a positive "all clear" signal before men return or traffic is resumed.

(8) For avalanche control by blasting, see Avalanche Handbook; for radio use and blasting, see 6.14(8), 6.15(3), 6.21(3); and for machine equipment and blasting, see 7.21A(5).

6.16 MISFIRES

(1) There SHALL be a waiting period of at least an hour before returning to a misfire if some of



the shots did not explode, and at least 15 minutes for single shots.

(2) If there is any reason to believe a charge is burning in a hole, the blaster SHALL have everybody removed from the danger area and the area SHALL be posted and guarded for 12 hours.



(3) If a misfire is in a mudcap or shallow shot, another detonator SHALL be inserted into the shot and fired again.

(4) If a misfire is in solid material and has been stemmed with water, another primer SHALL be prepared, placed on top of the first charge, and fired again.

(5) If a misfire is in solid material and has been stemmed or tamped with dirt or clay, the packing or stemming material SHALL be blown out with compressed air and a stiff rubber hose or bronze pipe nozzle. When enough of the stemming material has been removed to expose the explosives in the hole, another primer SHALL be prepared and placed, and the blast SHALL be refired.

(6) An attempt SHALL be made to detonate a misfire by drilling a nearby hole, loading, and firing only when the foregoing methods cannot be successfully used. This SHALL be done only under the direct supervision of the most experienced blaster.

(7) If the missed hole is on a flat rock or a slightly sloping face, the newly drilled hole SHALL be back of and at least one foot above the missed hole. Extreme care SHALL be taken to insure that the newly

drilled hole is parallel to or at a slight angle from the missed hole.

(8) When necessary to drill another hole on a vertical rock face, it should be at least a foot in front of and above the missed hole. The distance SHALL depend on the probable radius of the sprung hole and the angle of the drilled hole. Never drill behind or below it, or into the misfired charge.

(9) After the blast, a careful search SHALL be made for undetonated explosives.

6.17 DISPOSAL

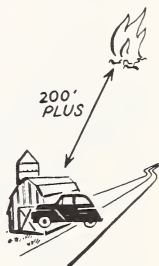
(1) Dynamite:

a. Sweepings from cars, shipping and magazine floors, and all deteriorated dynamite which is soft and mushy, or which shows nitroglycerin stains, and dynamite in cases that are discolored due to leakage SHALL be destroyed by burning at least 200 feet away from cars, buildings, and highways.

b. The dynamite or cases thereof SHALL be removed at least 200 feet to a safe distance and opened, with wooden wedges and mallets only. Special care SHALL be used if there are any signs of leaking.

c. Small amounts SHALL be destroyed by exploding them in a safe place. Larger quantities can be burned.

1. The amount burned at any one time SHALL be not more than 50 pounds, depending on local conditions. A new site SHALL be selected if more is to be destroyed.



6. 17(1)c. 2.

6. 17 (1) c. 2. Gelatins are particularly prone to detonate on burning, so not more than 10 pounds SHALL be destroyed at a time.

3. Dynamite SHALL never be burned in cases or deep piles.

4. The cartridges SHALL be removed, slit, and spread not more than 3 inches thick over the ground, preferably with a mat of loose paper or excelsior underneath them.

5. If the dynamite is wet and does not burn readily, pour a little kerosene, never gasoline, over it.

6. The pile SHALL be ignited by a small pilot fire of paper or wood shavings. This SHALL be arranged so that it will have to burn several feet, preferably against the wind, before it reaches any explosive material. The operator SHALL reach a place of safety before there is any possibility of an explosion.

d. There SHALL be no smoking or open lights.

e. Dynamite SHALL not be placed on hot ground.

f. Nobody SHALL return until there is no smoke and flame and the debris is cool.

g. Burning or hot explosives SHALL not be stirred, nor SHALL more explosives be added after burning has started.

h. The ground where the dynamite was destroyed SHALL be plowed as soon as it has burned, first making sure that all explosive material has been consumed and the ground is cool.

i. Empty cases SHALL be piled and burned separately.

(2) Detonators:

a. Employees SHALL not tamper with detonators in any manner.

CONST. & MTCE.

BLASTING

b. Detonators that have deteriorated or have been proved defective by galvanometer tests SHALL be destroyed by explosion with dynamite under some confinement.

c. Detonators SHALL not be thrown into small lakes or bodies of water such as rivers, creeks, ponds, wells, or water-filled abandoned quarries. They SHALL be destroyed this way--

1. First cut the wires off about 1 inch from the tops of the detonators, preferably with a pair of tin snips, one detonator at a time.

2. Not more than 100 detonators SHALL be placed in a box or paper bag, primed with about 1/2 pound of dynamite and a good electric detonator. This SHALL be buried under paper and dry sand or fine dirt, in a hole at least 6 inches deep.

3. This SHALL be fired from a safe distance with a blasting machine.

4. Not more than 100 detonators SHALL be fired at one time.

5. The ground around the shot SHALL be thoroughly examined to be sure no unexploded detonators remain.

6. The same hole SHALL not be used for successive shots unless the entire inside surface of the hole feels cool to the touch.



100
DETONATORS
ONLY!





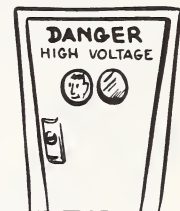


6.2 RADIO AND TELEPHONE

6.21 RADIO

(1) Because of the high voltages in certain circuits, only radio technicians or others specially instructed SHALL be allowed access in AC-powered equipment.

a. AC cabinet SHALL be locked, and the key SHALL be available only to radio technicians or others specially instructed and authorized.



(2) During lightning storms, operator SHALL--

a. Never use any radio if storm is within 1 mile.

b. Extend antenna on back-pack set only when storm is over a mile away.



(3) A radio transmitter SHALL not be used within 300 feet of any electric blasting or areas where electric detonators are handled or stored.

(4) Insulating platforms or rubber mats SHALL be provided in radio repair shops.



(5) See Lightning Protection Handbook, p. 10, for installation of broadcast receivers in lookout towers.



6.21(6)

6.21 (6) Whip antennas SHALL be provided with safety knob, closed loops, or other protective device to prevent injury when not extended.

(7) Technicians SHALL be physically well qualified and specifically trained before climbing in high places.

(8) Two men, when practicable, SHALL be present during work on high-powered transmitters.

6.22 TELEPHONE LINE, C&M--GENERAL

(1) All on-the-job orders SHALL be given by the foreman in direct charge.

(2) Before starting on any job, all essential tools, equipment, and supplies SHALL be checked. They SHALL be repaired or replaced if unsafe.



(3) All installations having possible conflict with power lines SHALL be carefully planned so that there is no danger to personnel working on telephone circuits.

(4) Employees SHALL--

a. Have thorough knowledge of location and hazards of telephone and power lines.

b. Check with power company before testing for trouble on lines crossing or close to power lines. If a power line short exists, the company SHALL correct it.

c. Stay away from wires if there is any reason to believe they might be dangerous.



CONST. & MTCE.

RADIO AND TELEPHONE
186

d. Never go above the top telephone wires for any reason when working on jointly used poles.

(5) Where 99a arresters are being installed, the connection to neutral wire of the power system SHALL be made only by power company workmen except where made to the ground conductor at the base of power pole.

6.23 TELEPHONE, C&M, EQUIPMENT

(1) Climbers SHALL be worn only when working on unstepped poles or trees. They SHALL not be left where persons may stumble on them or where points may be damaged.

(2) Pole gaffs should be used on poles and thin-barked trees, and tree gaffs on rough, thick-barked trees. Gaffs SHALL be kept sharp: See Telephone Handbook, p. 312, for minimum dimensions to which gaffs may be sharpened.



(3) Linemen SHALL personally inspect safety belts and straps daily for worn, hard, or dry leather; pliability; worn or broken sewing; cuts; cracks; loose rivets; and worn buckles, snaps, rollers, and tongues. They SHALL carry them in special compartments or hang them where they cannot be damaged; keep them away from heat; and never punch extra holes in them or splice them. Bend them smooth side out, over a 1-inch pipe to check for cuts. Place keeper of snap hook on strap, away from body when hooked in D-ring.



6.23(4)

6.23 (4) Belts or straps SHALL be discarded if--
a. They are cut or torn enough to affect their strength.

b. Leather is worn to less than 1/8-inch thickness.

c. There are other serious defects.

(5) Ropes and leather SHALL be kept away from acids, fumes, and strong alkalies.

(6) Ropes:

a. Wire-cored safety rope SHALL be used for climbing and trimming large trees. Safety ropes SHALL be 7/8-inch Manila, 12 to 15 feet long, with a steel core of six strands of seven twisted steel wires.

b. Ropes used for telephone construction SHALL be of best quality Manila hemp.

c. Rope SHALL not be taped or covered with other wrappings except in lieu of back splicing end to prevent unraveling.

d. Rope SHALL be handled and stored carefully so it will not be damaged.

e. All hand lines SHALL be examined frequently to be sure they are safe at all times.

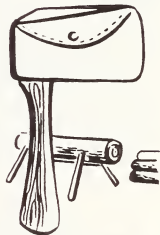
(7) Belt hand ax SHALL be sheathed.

6.24 POLE AND TREE OPERATIONS

See Telephone Handbook, pp. 55-65.

(1) Loading and Transporting:

a. Substantial, well-secured, and well-braced skids SHALL be provided where hand loading is necessary. Eliminate heavy lifting wherever possible.



b. Poles SHALL be securely chained while hauling vehicle is in motion, except after distribution has started along pole right-of-way.

c. Red flag SHALL be attached to rear end of longest pole.

d. Men SHALL be kept away from side of load while poles are being distributed.

e. No one SHALL be allowed to ride or stand on load of poles when unloading and distributing them.



(2) Raising:

a. Pike poles and hook ladders SHALL be inspected for serviceable condition.

b. When raising a long pole, four steadying pikes SHALL be used near top.

c. Poles should be held above ground line with two peavies or cant hooks to prevent roll when being raised with pike poles.

d. Plank or small pole should be used to force butt of pole into the hole when it is being raised. Don't stand on pole.



(3) Climbing:

a. Every new employee whose duties include climbing SHALL be tested to check his ability. Those unskilled SHALL be trained in climbing technique before being put to work.

b. Before poles are climbed, they SHALL be examined, especially at the ground line, for rot.



6.24(3)b. 1.

6.24 (3) b. 1. Surface defects both below and above ground can be noted with the naked eye, but a screw driver or a bar SHALL be used vigorously in searching for inner decay.

2. If a pole seems sound but age warrants suspicion, 3/8-inch holes SHALL be bored and examined. If not necessary to remove pole, plug holes with creosoted plugs.

3. Lineman SHALL not depend on testing a pole by "sounding" it with a block of wood or a heavy tool, nor by swaying it back and forth.

4. If the ground is frozen, assume that the pole is unsafe until tested.

5. If in doubt, brace pole with four pike poles before climbing. See 6.24(8).

c. Where immediate repair work is necessary, unsafe poles SHALL be cut off at the ground line and reset prior to climbing.

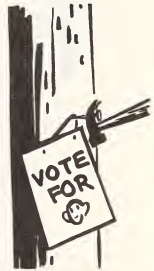
d. Signs or nails SHALL be removed from poles before climbing.

e. Climbers, gaffs, and straps SHALL be dependable and properly fitted to the legs.

f. Serviceable work gloves and high shoes SHALL be worn while climbing. Trouser legs SHALL be pulled up so that they will not snag on gaffs and knees will be free.

g. When climber is off the ground, safety belt with safety strap properly adjusted to pole or tree SHALL be worn.

h. The safety strap SHALL not be around pole or tree while lineman is moving up or down, except when there is danger of being thrown off



balance by high wind or other causes. It SHALL hang free with both ends of strap snapped into one D-ring.

i. WHEN CLIMBING POLES OR TREES, SHORT STEPS SHALL BE TAKEN AND GAFF PLACED WHERE IT WILL NOT SLIP. MAKE EACH STEP DELIBERATE AND FORCEFUL, WITH KNEE BOWED OUT, AWAY FROM THE POLE.



j. Climbers SHALL be extra cautious when climbing icy, frozen, cracked, knotty, rotten, crooked, case-hardened, or especially soft poles or trees.

k. When it is necessary to climb icy poles or trees, lineman SHALL place gaffs in the icy side, climbing the pole with hands on the drier side. On stubbed poles, lineman SHALL climb on side opposite stub so he won't strike it coming down.

1. When wearing gaffs, lineman SHALL step, not jump, down from trees or poles.

2. Ladders should be used instead of climbers whenever practical to do so, such as on large, thick-barked trees or when every pole or tree in a line must be climbed.



(4) Working Aloft:

a. Safety straps SHALL be fastened at all times.

b. Crossarms, braces, pins, and small limbs SHALL not be used for support.

c. Safety strap SHALL be used around that portion of the pole above the top crossarm only when the pole is at least 15 inches higher than the crossarm.



6.24(4)d.

6.24 (4) d. Handlines SHALL be used to pass tools, equipment, and materials to and from lineman or to rehang wire on insulators.

e. Ground workers SHALL stay away from trees being limbed and SHALL not work under tree or pole workers.

(5) Limbing:

a. When limbing a tree, workers SHALL take care to avoid cutting safety gear or themselves.

b. Pruning saws and extensions should be used wherever possible.

(6) Wire Stringing:

a. If there is danger of a pole falling, pole SHALL be guyed and braced before line wires are cut.

b. In using stretchers, workers SHALL be in the clear so that in case of slip or breakage, the ends of the wire will not whip against them.

c. On lines adjacent to high voltage lines, workers SHALL use rubber gloves, dry rope lines, and insulated tools.

d. Before repairing breaks on such lines, workers SHALL ground the line on both sides of the break. See Telephone Handbook p. 304-a.

e. Line workers SHALL not contact wire during lightning storms, even if storms are several miles distant.

f. FLIP SHALL BE GUARDED AGAINST WHEN WIRE IS RELEASED FROM OVERHANGING TREES, BRANCHES, STUMPS, ETC.



g. When stringing wire across a roadway, it SHALL not be carried up the pole unless a flagman is stationed on the road.

h. Wire SHALL not be tied to tool belt or body.

i. When there is doubt about clearance, a handline SHALL be used for raising wire. Handline SHALL not be tied to the tool belt or body when the line wire is attached.



(7) Taking Up Wire:

a. When reeling up wire parallel to a powerline, one man SHALL be at the rear to hold the wire taut so that the end will not catch and fly up into power wires.

b. Always hold to a dry rope tag line 20 feet or so in length, tied to the end of the wire being pulled.

c. Where the telephone wires are being removed from a crossing under a powerline, they SHALL be cut at the crossing and reeled in from the opposite ends.

d. After the wire is reeled up, coils SHALL be tied securely at four places and ends of the tie wires pressed into the coils before removing from the reel.

(8) Dismantling:

a. Poles that will not be salvaged should be sawed or chopped off rather than dug out.

b. If pole is weak it SHALL be supported with pike poles before climbing, or--

1. Set new pole next to old one.



6.24(8)b.2.

6.24 (8) b. 2. Before climbing, brace old pole with four pike poles.

3. Lash them together with rope.

4. Guy old pole four ways with 3/4-inch rope.

5. Guard against kickback when releasing last strain on old pole.

CONST. & MTCE.

RADIO AND TELEPHONE
194



6.3 CONCRETE AND MASONRY

6.31 GENERAL

(1) High lines, buckets, or other rigging transporting concrete SHALL be designed and constructed so as to safely carry their maximum loads.

(2) Loaded concrete buggies and wheelbarrows should be pushed, not pulled. If necessary to pull them, rope can be attached to the front.

(3) See also 7 Equipment.

6.32 FORM WORK

(1) Forms SHALL be designed and constructed to safely carry the wet concrete load. Nails SHALL be removed from salvageable form lumber when forms are being dismantled.

(2) Mud sills SHALL be used on all shoring resting on the ground.

(3) Wire ends, sharp ends of reinforcing, etc. SHALL not be left exposed.

(4) Men clipping ends of form tie wires should wear leather gloves.



6.33 PLATFORMS

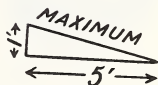
(1) Platforms for cement-mixer and pouring operations SHALL be constructed from sound lumber, free from large or loose knots of 2 inches or larger in diameter.



(2) Guardrails SHALL be constructed on sides of platforms that are 3 feet or more above ground level.

6.34 RUNWAYS

(1) Elevated runways or ramps for pushing material to and from the mixer SHALL be well supported and braced. Ramps should have not more than 1 foot rise in 5 feet horizontal distance.



(2) Guardrails SHALL be provided as in 6.33(2). The minimum width of runway and clear distance between guardrails SHALL be equal to 2 feet more than the overall width of the widest equipment using the runway.

(3) Stop cleats SHALL be used at all places where wheelbarrows or buggies are dumping materials.

(4) Runways SHALL be kept free of slipping hazards.

6.35 STONE AND BRICK MASONRY

(1) Scaffolds SHALL be of the heavy trade type, securely built, level, well braced, and equipped with railings and toeboards.

(2) Scaffolds and floors SHALL not be overloaded.

(3) Mortar boxes SHALL be kept free from ragged edges.

(4) Backfilling SHALL not be done against green walls.

(5) Workmen SHALL be provided with protective creams, to avoid lime burns. A bottle of glycerin or olive oil SHALL be included in the first aid kit where men are handling lime, for use when lime gets into open cuts or eyes.



6.36 MIXERS

(1) Skip SHALL be landed when mixer is idle or when working on it.

(2) Everyone SHALL be in the clear before skip is moved up or down.

(3) Cables, hoist, and brake mechanisms SHALL be inspected daily during periods of use.



(4) Power SHALL be turned off and repairs made at once before worn or defective parts cause injury.

(5) Stationary equipment SHALL be blocked and level.

(6) Waste material SHALL not be allowed to accumulate around mixers.







6.4 EXCAVATION

6.41 GENERAL

(1) Before excavating below foundations and footings next to buildings, you SHALL provide adequate shoring and underpinnings.

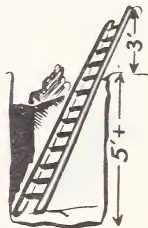
(2) Surface materials such as rocks and trees SHALL be removed if they might fall into the excavation. Excavated or other material SHALL be stored at least 2 feet from edge of excavation.

(3) Guardrails, barricades, or fences SHALL be erected to protect workers and the public from excavation hazards. Warning signs SHALL be posted. All excavations on or near public thoroughfares SHALL be marked at night by red lanterns or torches.



(4) Materials used for sheeting, sheet piling, bracing, shoring, and underpinning SHALL be in safe condition. Timbers SHALL be sound and free from large or loose knots, No. 2 Common or better.

(5) Ladders extending from the floor of excavation to 3 feet above ground level SHALL be placed at about 50-foot intervals in all excavations 5 feet or more deep.



6.41(6)

6.41 (6) All truck driveways and areas around equipment, such as ramps to crushers, driveways under bins, wells under elevators or conveyors, overflow from grating guards, etc., SHALL be kept clear of large rocks or other debris that might cause accidents.

(7) Barriers not less than 8 inches high SHALL be provided and anchored on firm bearing where vehicles are required to back up to open pits, hoppers, and excavations.



(8) When removing a high overhanging bank, work SHALL progress from the side toward the middle. Workers SHALL always face the point of danger and wear safety belts and lifelines.

(9) Boulders SHALL be pried from above or sides.

(10) All banks SHALL be inspected frequently for cracks and earth shifts, which may indicate the beginning of slides, especially after rains or freezing weather.



(11) Worker SHALL not work alone in excavations or trenches. They should work 12 feet apart.

(12) Planning and construction of shoring SHALL be governed by the nature of the ground.

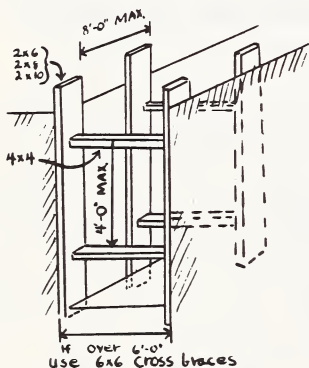
6.42 TRENCHES--UNSTABLE OR SOFT MATERIAL

(1) VERTICAL BANKS OF TRENCHES IN UNSTABLE OR SOFT MATERIAL 4 FEET OR MORE IN DEPTH SHALL BE SUPPORTED BY CONTINUING VERTICAL SHEET PILING AND BRACES.

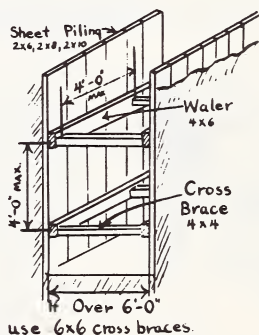
(2) Wooden sheet piling SHALL be not less than 2 inches thick.

(3) Sheet piling SHALL be held in place by longitudinal timbers or walers, at vertical intervals of not more than 4 feet.

(4) Walers SHALL in turn be supported by 4- by 4-inch cross braces, spaced a maximum of 4 feet.



**TRENCHES IN HARD
COMPACT MATERIAL**



**TRENCHES IN
UNSTABLE OR
SOFT MATERIAL**



6.42(5)

6.42 (5) Extra bracing SHALL be used to prevent slides or cave-in when excavations or trenches are made in old fills, next to backfilled excavations, or subjected to vibrations from railroad or highway traffic, operation of machinery, or any other source.

6.43 TRENCHES--HARD, COMPACT MATERIAL

(1) FOR TRENCHES 5 OR MORE FEET DEEP AND 8 OR MORE FEET LONG, SIDES SHALL BE SLOPED TO ANGLE OF REPOSE OR SHALL BE VERTICALLY BRACED WITH AT LEAST 2- BY 6-INCH PLANKS OPPOSITE EACH OTHER AGAINST THE TRENCH WALL AT HORIZONTAL INTERVALS OF NOT MORE THAN 8 FEET. THIS DOES NOT APPLY TO TRENCHES IN SOLID ROCK OR HARD SHALE ON LEVEL GROUND.



(2) These braces SHALL extend to trench bottom and be held in place by horizontal cross braces at right angles to both braces, cleated and tightly wedged, and of the sizes shown in sketch on page 201.

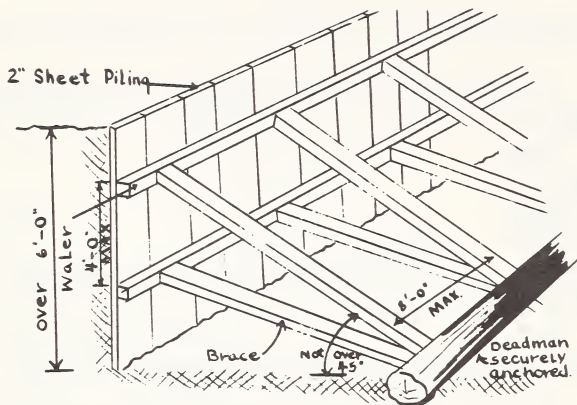
(3) Undercutting SHALL not exceed 6 inches on either side of trench.

6.44 BULKHEADS AND RETAINING WALLS

(1) Banks over 6 feet high resulting from excavating for bulkhead construction, retaining walls, bridge abutments, wing walls, etc. SHALL be shored to protect workers, unless sloped to the angle of repose of the material.

CONST. & MTCE.

EXCAVATION



Bulkheads and Retaining Walls

(2) The spacing of shoring and bracing SHALL be in accordance with these standards:

BULKHEADS AND RETAINING WALLS

<u>Height of bank (feet)</u>	<u>Waler size (inches)</u>	<u>Brace size (inches)</u>
6--8	4 x 4	4 x 4
8--10	4 x 6	4 x 6
10--12	6 x 6	6 x 6
Over 12	8 x 8	8 x 8

Length of braces in inches SHALL not exceed 60 times the least dimensions without bracing.



6.44(3)

6.44 (3) Adequate bearing SHALL be provided at the lower end of diagonal shoring to resist the thrust of the bank above,

(4) Long braces SHALL be centerbraced to prevent buckling, if intended to carry maximum loads, where length exceeds 60 times least dimension.

6.45 GRAVEL PITS

(1) Banks SHALL be sloped around the pit and at truck entrances and exits to eliminate slide danger.

(2) Overburden SHALL be stripped back from the edge of pit or bank at least 12 feet. For high banks or deep pits, the width of the stripped area SHALL be not less than one-half of the slope distance of the working face of the pit or bank.

(3) The cut bank of the overburden SHALL be sloped to at least 45°.

(4) Trees or boulders above the pit or near the edge of the overburden SHALL be removed if they could start a slide or fall into the pit.

(5) Hand-loading gravel pit or bank slopes SHALL not exceed the following:

Bank height (feet)

Slope (degrees)

Up to 6

90 (no overhang)

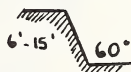
6 to 15

60

16 and up

45

In all cases where rocks 4 inches or larger are present, bank slope SHALL not exceed 45°.

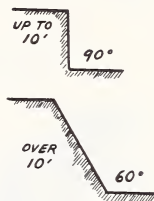


CONST. & MTCE.

EXCAVATION

(6) Bank slopes in shovel-loading gravel pits SHALL not exceed the following:

<u>Bank height</u> <u>(feet)</u>	<u>Slope</u> <u>(degrees)</u>
Up to 10	90 (no overhang)
Over 10	60



(7) Pit or bank faces and stripped area in old pits with banks over 4 feet high SHALL be examined before work is started.

(8) High gravel banks or deep pits SHALL be worked out in benches; all material from the top bench SHALL be removed before lower levels are worked.

(9) Special precautions:

a. Gophering and undermining SHALL be prohibited.

b. Men working on slopes exceeding 60° in hard, compact material SHALL wear safety ropes when more than 6 feet above pit floor.

c. Pits that have been blasted to loosen gravel SHALL be inspected by blasters before workmen are permitted to return.



6.46 QUARRIES

(1) Overburden SHALL be stripped back from top edge of quarry for a distance of 12 feet.



6.46(2)

6.46 (2) The cut bank of the overburden SHALL be sloped to at least 45°.



(3) Trees, snags, or large rocks that can fall into quarry SHALL be removed.

(4) Loose rock SHALL be scaled from the quarry face frequently.

a. QUARRY FACES SHALL BE EXAMINED DAILY DURING FREEZING AND THAWING WEATHER FOR ROCKS THAT MAY BE DISLODGED BY WEATHERING ACTION.

b. Scalers SHALL wear safety belts and be securely tied with safety ropes while at work.

(5) After each shot, the blaster SHALL make an examination before workmen are permitted to return to the pit.

(6) Wherever practicable, a minimum distance of 10 feet should be maintained between workmen unless 2 or more men are required to accomplish the same tasks.

(7) If possible, the face of the quarry should slope enough to eliminate the danger of falling rocks.



(8) All quarries SHALL be fenced. Danger signs, warning of the blasting activities, SHALL be posted.

(9) Special precautions:

a. Men SHALL wear safety ropes when working over 6 feet above pit floor.

b. Danger areas in quarries SHALL be barricaded as a precaution to safeguard human beings and livestock.







6.5 LADDERS AND SCAFFOLDS

6.51 LADDERS

A. CONSTRUCTION

(1) Ladders SHALL be constructed of thoroughly seasoned, straight-grained lumber, free from cross-grain, splits, shake, decay, or other defects. They SHALL not be spliced. Knots SHALL be tight, SHALL not exceed $1/2$ inch in diameter, and SHALL not be nearer than $1/2$ inch from edge of rail or 3 inches from a rung. Wood rungs SHALL be free of knots and SHALL be inserted in notches or holes in side rails and securely fastened, with uniform spacing, not exceeding 12 inches.

(2) All ladders SHALL be constructed to carry their intended loads safely. All weakened, worn, broken, or patched ladders SHALL be destroyed.

(3) Linseed oil or clear varnish, rather than paint, should be applied to ladder surfaces to avoid covering defects.

(4) Cleats, metal points, safety shoes, lashing, or other effective means SHALL be used if there is danger of slipping.

(5) Stepladder SHALL have a locking device or spreader to hold it in open position.



6.51B.

6.51 B. USE

(1) Metal ladders SHALL not be used around electrical equipment.

(2) Ladder SHALL be set with base one-fourth the distance to the top support.

(3) Extension ladder should be raised to vertical position or against wall before it is extended.

(4) Ladders SHALL extend 3 feet above any landing surface.

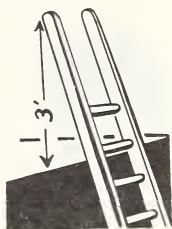
(5) The base of a long ladder being raised should be held or blocked against something solid.

(6) Ladder SHALL be faced and both hands SHALL be used when ascending or descending.

(7) Ladder SHALL be moved to a new location when person has to lean more than 1 foot to side.

(8) Ladders SHALL not be used in horizontal positions.

(9) You SHALL not stand on the top two steps of ladders.



C. STORAGE

(1) Ladders SHALL be stored under suitable cover, protected from weather, in a dry location, away from excessive heat.

(2) They SHALL be supported in storage so they will not sag.

6.52 SCAFFOLDS--GENERAL

(1) Scaffolds SHALL be well made and SHALL be erected and removed only by qualified men.



(2) Lumber SHALL be carefully inspected and SHALL be strong enough for the purpose, sound, and free from large knots and other imperfections.

(3) Uprights SHALL be plumb, SHALL rest on solid footing, and SHALL be fixed at the bottom to prevent shifting.

(4) Ramps and runways SHALL be at least 20 inches wide.

(5) Stairs or ladders SHALL be provided, for safe access to scaffolds.

(6) All scaffolds SHALL have guardrails and toeboards, at least 4 inches high.

(7) Scaffolds built by one crew SHALL never be used by another crew until they have been thoroughly inspected and pronounced safe.



(8) Overhead protection SHALL be provided if it is necessary to work under scaffolds. Scaffolds SHALL be protected against trucks striking them or dumping material against them.



6. 52(9)

6. 52 (9) During the winter season, snow and ice SHALL be removed from scaffolds before work is started. Sprinkle with sand or ashes when slippery.

(10) Scaffolds SHALL not be overloaded nor used for storage except materials being used currently. Tools and rubbish SHALL be lowered carefully at end of each day.

(11) Scaffolds SHALL be removed immediately after the completion of the work for which they were built. All nails should be pulled from each piece of scaffolding as it is removed, and the materials should be piled neatly.



(12) This table SHALL be used as a guide in the selection of scaffold planks.

SAFE LOADS IN POUNDS FOR SCAFFOLD PLANKS*

Span (feet)	2x6	2x8	2x10	2x12	3x10	3x12
6	108	144	182	220	536	650
8	76	102	129	156	389	472
10	56	75	95	115	293	361
12		56	72	87	235	285
14			54	64	188	228
16				47	151	183
18					120	146
20					95	114

*For loads concentrated in the center of the plank. They may be doubled for loads uniformly distributed over the entire length of the plank. Loads are com-

CONST. & MTCE.

LADDERS - SCAFFOLDS

puted for spruce or Norway pine and may be increased for Douglas-fir and longleaf yellow pine to weights obtained by multiplying by these constants: Douglas-fir, 1.14; longleaf yellow pine, 1.55.

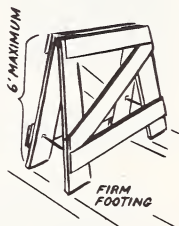
6.53 HORSE SCAFFOLDS

(1) Horse scaffolds should not exceed 6 feet in height.

(2) All legs SHALL stand securely on a solid footing.

(3) Tops of horse scaffolds SHALL be level, regardless of the height of the horse.

(4) Ramps SHALL not be used with horse scaffolds.



6.54 SWINGING SCAFFOLDS

(1) Painters' scaffolds and other light, swinging scaffolds that are supported by ropes SHALL conform to rope and plank standards given in 6.62(7) and 6.52(12). There SHALL be no test loading.

(2) Ropes SHALL be protected from sharp tools and from contact with acid and other chemicals.

(3) Swinging scaffolds SHALL always be lowered to the ground or lashed to the structure at the end of the day's work.

(4) Swinging scaffolds SHALL be provided with back rails and 5/8-inch wire rope or 3/4-inch round steel bridle at each end.



6.55

6.55 RIVETING SCAFFOLDS

(1) Guardrails SHALL be provided whenever practicable and every precaution SHALL be taken to prevent accidents.

(2) All suspended riveters' scaffolds SHALL have not less than 1 1/4-inch Manila rope, or its equivalent, secured to the beams or girders to prevent slipping.

6.56 POST AND POLE SCAFFOLDS

(1) The following dimensions SHALL be used as guides for pole scaffolds not more than 25 feet in height:

<u>Item</u>	<u>Heavy trades*</u>	<u>Light trades**</u>
Uprights	4x4x6' c-c	2x4 or 2x6x8' c-c
Ledgers	2 1x6 or 1 2x6	2 1x6 or 2 1x8
Ribbon (or stringer)	1 1x6 or larger	1 1x6 or larger
Handrail	1x6, 1x8, or 2x4 Place 3' above platform	1x6, 1x8 or 2x4x3' above platform
Platform	2x10 or 2x12 planks overlapping at least 1'	Not less than 2 2x10 planks over- lap 1'
Toeboard	1x6 or wider	1x6 or wider
Cross bracing	1x6 or larger	1x6 or larger
Foot blocks	2x8 or larger	2x6 or larger
Scaffold width	4'	3'
Splices on upright	4 1x4x30	2 1x4 or 2 1x6x30 or larger

CONST. & MTCE.

LADDERS - SCAFFOLDS

- *Heavy Trades: stonemasons, bricklayers, and plasterers.
- **Light Trades: carpenters and painters.

(2) If poles are used in place of posts, the diameter SHALL not be smaller than the largest dimension in the corresponding members, as given above.

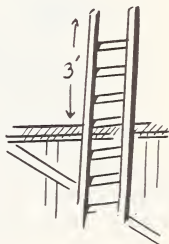


**LIGHT TRADES
POLE SCAFFOLD**

Definitions: Ledgers are nailed to up-rights transversely for support of platform planks. Ribbons are nailed to inside of up-right longitudinally and directly below ledgers. Toeboards are nailed to inside of outside uprights longitudinally and adjacent to top surface of platform plank.

(3) Scaffolds 25 to 64 feet high SHALL have these uprights: 4x6 inches for stonemasons; 4x4 inches for bricklayers and plasterers; and 3x4 inches for carpenters and painters.

(4) If scaffold is 6 feet high or more, uprights SHALL be extended 3 feet and guardrails attached.



(5) Cleats used to splice uprights SHALL be of sound wood not less than 30 inches long, well nailed onto adjacent sides of the uprights at the joints, with two cleats per splice.

(6) Spliced joints SHALL be staggered to provide stiffness for the entire structure.



6.56(7)

(7) In no case SHALL scaffold flooring be less than 24 inches wide.

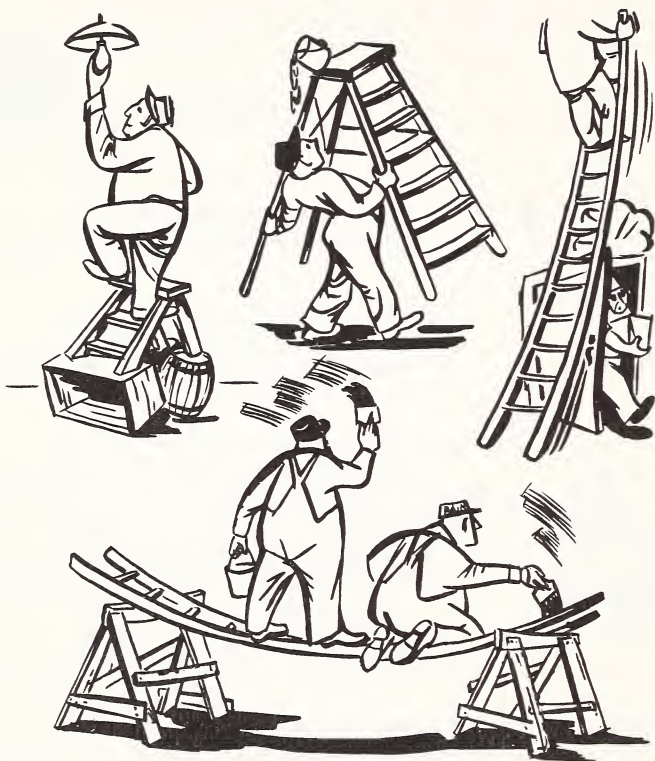
(8) Where concrete buggies are used on a scaffold, ledgers and planking SHALL be designed to support a concentrated load of 500 pounds in addition to the normal scaffold loading.

6.57 SINGLE POLE SCAFFOLDS

(1) Single pole scaffolds, with the wall that is under construction as the inner support, SHALL be constructed as outlined for pole scaffolds, except that ledgers SHALL be at least 4 x 4 inches in size and SHALL extend at least 1 foot beyond the ribbons.

(2) Scaffolds SHALL be braced to the structure under construction or to other fixed objects.

Note: Tables from Associated General Contractors' Manual of Accident Prevention.







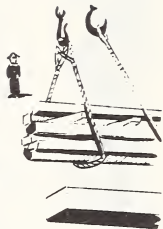
6.6 RIGGING

6.61 GENERAL

(1) Only qualified employees SHALL tie on, signal, or operate hoists.

(2) All employees SHALL keep away from moving lines, lines and blocks under strain, and suspended loads.

(3) The following SHALL be removed from service: Drums, sheaves, or pulleys with eccentric bores or cracked hubs, spokes, or flanges; hooks, shackles, rings, and slings that have been bent, spread, or otherwise damaged; and frayed ropes and cables.



6.62 ROPES--Manila fiber is preferable to other kinds of rope.

(1) Ropes SHALL be inspected frequently for broken strands, cuts, and worn or frayed spots. Unsafe rope SHALL be replaced.

(2) Acids and acid fumes SHALL be kept away from rope.

(3) Rope should be uncoiled from inside to prevent kinking.



6.62(4)

6.62 (4) Rope should not be dragged over rough surfaces.

(5) Rope should be dried thoroughly after use. Frozen or wet rope should not be piled against steam pipes or other heat sources.

(6) Rope should be coiled and piled or suspended so that air can circulate through the coils.



(7) Federal standards for new Manila rope:

<u>Diameter, approx.</u> <u>(inches)</u>	<u>Breaking strength</u> <u>minimum</u> <u>(pounds)</u>	<u>Safe load,</u> <u>1/8 maximum</u> <u>(pounds)</u>
1/4	600	75
1/2	2,650	331
3/4	5,400	675
1	9,000	1,125
2	30,000	7,500

6.63 WIRE ROPES AND CABLES

(1) All working wire ropes and cables SHALL be inspected when installed and at least once a week when in use.

a. Each free end should be fitted with a thimble or other fitting.

b. Wire rope SHALL be removed from hoisting or load carrying when any of the following conditions exist:

1. 3 broken wires in 1 strand of 6x7.

2. 6 broken wires in 1 strand of 6x19.



CONST. & MTCE.

RIGGING

3. 9 broken wires in 1 strand
of 6x37.

4. 8 broken wires in 1 strand
of 8x19.

5. When marked corrosion
appears.

6. When 4 percent of the total
number of wires in the rope are broken.

c. Leather gloves SHALL be worn
while handling wire ropes or cables.

(2) Cables having broken or frayed
strands SHALL be replaced. The new cable
strength SHALL be equal to the original, and
strands SHALL be twisted in the same di-
rection.

(3) Wire ropes that have been kinked
SHALL be considered unsafe.

(4) Ropes SHALL be untwisted or un-
laid only for splicing purposes.

(5) Worn ropes SHALL not be used as
line running over sheaves or drums.

(6) Wire rope should be lubricated
regularly to avoid excessive internal
strains and rusting.

(7) The working load of a wire rope
SHALL not exceed one-sixth of its breaking
strength (a safety factor of 6). The factor
of safety SHALL be determined by careful
consideration of all data, such as the load,
speed, size, arrangement, and number of
sheaves and drums, and the degree of
danger to life and property. See 6.67(4) for
size of sheave.



DANGER



6.63(8)

6.63 (8) Guards SHALL be provided at all points where persons or materials might come in contact with moving rope.

(9) Wire ropes SHALL be fastened to drums only by zinc plugs or suitable clamps.

(10) Wire rope should not overwrap unevenly on drums.

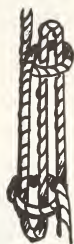
(11) Wire rope only of a size that will fit into pulley and sheave grooves properly SHALL be used. If necessary, pulleys and sheaves SHALL be regrooved to size.

(12) Hands SHALL be kept off cable feeding a drum, pulley, or sheave.

(13) All clamps SHALL be attached with the "U" over short end of cable.

(14) Clamp nuts SHALL be inspected and tightened frequently.

(15) APPROXIMATE BREAKING STRENGTH OF WIRE ROPE IN 2,000-POUND TONS.



Diameter of cable (inches)	Material			
	Iron	Cast steel	Mild plow steel	Plow steel
1/4	1.0	1.8	2.0	2.2
5/8	5.5	10.4	11.4	12.5
3/4	7.8	14.8	16.3	17.8
7/8	10.6	20.0	22.0	24.0
1	13.7	26.0	28.6	31.2
1-1/8	17.2	32.8	36.0	39.4
1-1/4	21.0	40.4	44.4	48.4
1-3/8	25.2	48.6	53.4	58.3
1-1/2	29.7	57.5	63.3	69.0

6.64 CHAINS

(1) Chains SHALL be inspected frequently for small cracks, corrosion, pits, signs of crystallization, and deformed, stretched, weak, or gouged links, and SHALL be replaced if in weakened or doubtful condition.



(2) Sudden shocks and overloading SHALL be avoided.

(3) Chains SHALL not be kinked or knotted.

(4) After hitching or hooking chains or cables to objects such as, logs, stumps, or machines, everybody SHALL stand clear and as far away from the tractor or load as the length of chain between them.



(5) Chains that have been stiffened or stretched by overloading SHALL be condemned.

(6) The hook SHALL be completely over a link so chain cannot slip and hook will not be bent, and as far from the load as possible, so the pull is on the back of hook; then a straight steady pull SHALL be made.



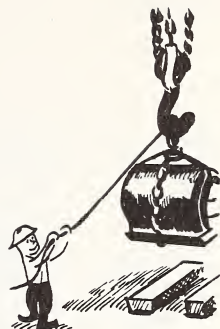
(7) Safe load in tons for iron chain is six times the square of the chain stock in inches.



6.65 CHAIN BLOCK HOISTS

(1) Running gear, hooks, straps, and chains SHALL be inspected for cracks and other signs of fatigue, to make sure they will not slip or give way under strain.

(2) Overhead support and rigging SHALL be sufficiently strong to carry maximum loads with ample safety factor of 2 1/2 to 1.



(3) Chain block SHALL be side-pulled only when superstructure is braced to withstand lateral strain.

(4) Heavy loads should be guided with ropes rather than by hand.

6.66 HAND HOISTS

(1) Operators SHALL act only on signals clearly understood by everyone concerned.

(2) Ratchet pawl SHALL be engaged when loads are lifted or suspended.

(3) Crank SHALL be removed when a load is suspended.

(4) Operator SHALL have a free floating grip on crank handle so that thumb cannot be broken.



6.67 SHEAVES, TACKLE BLOCKS, AND PULLEYS

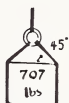
(1) They SHALL be inspected immediately before use and condemned if defective.

(2) They SHALL be kept well lubricated.

(3) Loads SHALL not be placed on points of hooks.

(4) Sheaves should be not less than 6 times the diameter of Manila rope and not less than 32 times the diameter of wire rope.

(5) The angle of a sling alters the safe carrying capacity of a load as follows:



6.68 GIN POLES

(1) Gin poles SHALL be set perpendicular to or raked slightly toward the load to be lifted so that the pole will not interfere with the load or hoist lines. See Telephone Handbook for erection methods.

(2) A safety factor of 3 SHALL be used for strength determination of pole, guy cables or braces, hoist lines, and blocks. This means that the load SHALL not exceed one-third of the breaking strength of these items.

(3) A safety factor of 6 SHALL be used as allowance for shock loads when using power-operated hoist or tractor drawbar for lifting loads.



ROLLING HITCH



BOWLINE

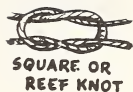


OVERHAND KNOT



6.68(4)

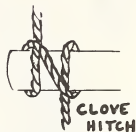
6.68 (4) The pole SHALL be straight and free from any serious defects.



(5) Pole length SHALL be less than 60 times its top diameter.

(6) Hoisting tackle and guy lines SHALL be securely attached to pole.

(7) GUY LINES OR BRACES SHALL BE SAFELY ATTACHED TO SUBSTANTIAL ANCHORAGES.



(8) Pole base or sill SHALL be large enough in area to prevent settlement and SHALL be braced against slippage.

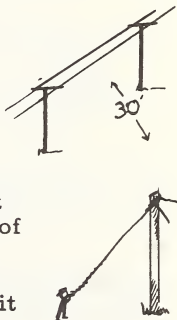


a. A shallow hole 9 inches deep in solid ground will serve as a ground anchorage.

b. The base of the gin pole SHALL be guyed against the winch pull.

(9) A gin pole SHALL not be set up or operated under an electric line.

(10) When a gin pole is to be operated in the vicinity of a powerline, extreme care SHALL be used to be sure that the winch line and the guy lines are of such lengths and so positioned that they could not come closer than 30 feet to the powerline in the event of a cable break or a sudden slackening of the guy lines. Remember that a sudden pull on a slackened line may carry the middle of the line to a higher point than it would be when taut.





6.7 WELDING

6.71 GENERAL

(1) Only competent welders, mechanics, machinists, blacksmiths, or especially qualified men SHALL be allowed to use welding equipment.

(2) Clothing that protects hands, arms, and body SHALL be worn, including nonskid boots and trousers without cuffs. Flameproof gauntlet gloves should be worn.

(3) Welding hoods or goggles SHALL be worn by welders and their helpers. Clear goggles SHALL be worn when preparing the work. See 7.3 Safety equip.



(4) Fire extinguishing equipment SHALL be easily accessible at all times during welding operations.

(5) All welding SHALL be done in the blacksmith shop, repair shop, in the open, or on a fireproof floor away from combustible materials. There SHALL be no leaks in the hose or connections, and there SHALL be adequate ventilation.

(6) Welding SHALL be done behind a screen if other workers without hoods or goggles are present.



6.71(7)

6.71 (7) Before cutting into tanks, drums, etc., their contents SHALL be carefully determined, then they SHALL be:

a. Drained, steam-cleaned, and dried if they show evidence of oil, gasoline, or other highly flammable fluids.

b. Thoroughly dried in the sun.

c. Filled with water up to the point to be welded, with opening left for escape of steam if any is generated during the welding.

AIR HOLE



(8) When welding brass or zinc-coated metal, job SHALL be done in a draft or wherever air is circulating; or a respirator SHALL be used. The fumes SHALL not be breathed.

(9) Whenever welding on metal coated with paint containing lead, respirator SHALL be used.

(10) Sparks and flames SHALL be kept away from cylinders and hose lines.

(11) Hose lines SHALL be inspected frequently. Worn items SHALL be replaced or repaired.



6.72 ARC WELDING

(1) All electrical connections SHALL be checked before starting work.

(2) Welding machine SHALL be grounded.

(3) Insulated platform SHALL be used in wet places.

CONST. & MTCE.

WELDING

(4) Warning signs should be provided, to prevent eye injuries to observers.

(5) Switch SHALL be turned off when work is stopped. Switch should be provided near at hand.

(6) Insulation and protective coverings SHALL be in safe condition. Only rubber-covered cable, without any splices, SHALL be permitted within 10 feet of the electrode holder.

(7) Cable SHALL be checked often and replaced or repaired if worn.

(8) Cable should be supported overhead, out of the way, off the floor.

(9) Welding leads SHALL be kept clear of the primary leads of electric motor-operated welders.

6.73 OXYACETYLENE WELDING

(1) Oxygen or acetylene SHALL not be needlessly discharged through the torch before lighting.

(2) Oxygen or other gases SHALL not be used where oils or any combustible liquids are present.

(3) Welder SHALL--

- a. Shut off gases when putting down a welding or cutting torch.
- b. Avoid excessive pressures.
- c. Never allow pressure to remain in the hose for long periods or overnight.

NO
PRESSURE AT
NITE



6.73(3)d.

6.73 (3) d. Protect hose from all sources of damage.

(4) All gages SHALL be checked frequently for accuracy and perfect functioning of valves.

(5) Cylinders SHALL not be subjected to temperature above 130° F.

6.74 HANDLING OXYGEN AND ACETYLENE EQUIPMENT

(1) Acetylene cylinders SHALL be used and stored in upright position only. See 6.74(15).

(2) If transported temporarily in horizontal position, cylinder should remain upright for 2 hours before use.

(3) Oxygen cylinders or apparatus SHALL not be handled with greasy or oily hands, gloves, or rags.

(4) Valve cap, gage, coupling threads, hose, or connections SHALL not be oiled.

(5) Valves SHALL be closed, and valve protection cap SHALL be in place before moving cylinders.

(6) A cylinder truck or equivalent device SHALL be provided to keep cylinders from upsetting while in use or when being moved.

(7) All cylinders SHALL be carefully handled to avoid damage and to prevent leaks.



- (8) Valve requirements SHALL be--
- a. Open valves on cylinders for an instant before attaching regulators so as to remove any dirt.
 - b. Before valves are opened and after attaching regulators to cylinders, release the adjusting screws of regulators.
 - c. Open slowly.
 - d. If difficult to open, point valve opening away from you and use greater pressure on valve key or wheel.
 - e. Do not use wrenches on hand wheel valves.
 - f. Open torch valves sufficiently to purge both hoses before lighting the torch, whenever pressure has been cut off in either gasline.
 - g. Close cylinder valves and release all gas from regulators before removing regulators from cylinder.
 - h. Close valves on all empty cylinders. Replace cap on oxygen cylinder.
 - i. When cylinders are not provided with fixed hand-wheel valves, keys or handles SHALL be kept on valve stems while cylinders are in service.

(9) Gas SHALL be taken from cylinders only through regulators and hose intended for and used only for this purpose.

(10) Acetylene SHALL be used only at 15 pounds pressure or less.

(11) Gas leaks SHALL be tested with soapy water only, never with open flame.

(12) Cylinders SHALL not be connected to pipe or manifolds.

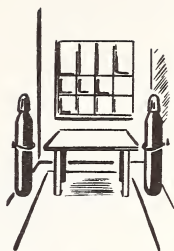


6.74(13)

6.74(13) Gas SHALL not be transferred from one cylinder to another.

(14) Cylinders of oxygen and acetylene SHALL be stored separately, in a dry place away from stoves, heat, and flammable material, especially oils and greases.

(15) Individual chains or other steadying devices SHALL be provided to keep cylinders in vertical position.



CHAPTER 7

EQUIPMENT

LEGEND

CAPITALIZED TEXT--somebody was killed by not observing these practices.

SHALL--denotes a mandatory requirement.
The SHALL's are capitalized for easy reference.

SHOULD--denotes a recommended practice.

It is the duty of each of us
to prevent accidents - and to
protect himself and others
from injury



CHAPTER 7. EQUIPMENT

CONTENTS

SUBJECT	Page	SUBJECT	Page
7.1 HANDTOOLS, INCL.		7.2 MACH. EQUIP. -	
POWER		(Cont.)	
General	235	Tractors (Cont.)	
Toolboxes	236	Adjustments.....	258
Chopping Tools..	236	Scrapers, Carry-	
Cutting Tools....	238	all	259
Handsaws	238	Timber Ops....	259
Bow Saws	238	Terracing.....	260
Crosscut Saws..	239	End Loaders	261
Draw Knives ...	239	Graders	261
Files	239	General	261
Material Handling		Pub. Protection.	262
Tools.....	240	Operation.....	262
Bars	240	Maintenance....	264
Grub Hoes, Picks	240	Shovels and Cranes	264
Hand Trucks ...	240	Placement	264
Jacks.....	241	Operations.....	265
Pike Poles	241	Maintenance....	267
Shovels	241	Transporting...	268
Wedges.....	241	Crushers	269
Wheel Barrows.	242	General	269
Striking Tools--		Construction ...	269
Chisels, Hammers	242	Operation.....	269
Torsion Tools...	243	Brush Chippers .	270
Screwdrivers...	243	Compressors ...	271
Wrenches	243	Jack Hammers..	271
Power-Activated		Machine Tree	
Handtools	244	Planting	271
Air.....	244	7.3 SAFETY EQUIP.	
Electric	245	General	273
Saws	245	Foot and Leg	
7.2 MACH. EQUIP.		Guards, Safety	
General	247	Shoes	274
Inspection.....	248	Goggles	274
Guards and Safety		Hard Hats.....	276
Devices	249	Life Preservers.	277
Signaling	250	Parachutes.....	277
Transportation ..	252	Respirators.....	277
Tractors.....	254	Rubber Gloves...	278
General	254	Safety Belts,	
Driving.....	255	Ropes, and Nets .	278
Hitching and			
Towing	257		



7.1 HANDTOOLS, INCLUDING POWER

7.11 GENERAL

(1) These guiding principles SHALL be observed when using tools--

- a. The right tool SHALL be selected for the job.
- b. It SHALL be in good condition.
- c. It SHALL be used correctly, for its intended purpose only.
- d. It SHALL be kept in a safe place, both on the job and in storage.



(2) Sharp-edged tools SHALL be guarded or sheathed when carried to and from the job, except in emergencies.



(3) When carrying tools, workers SHALL stay at least 6 feet away from other workers, with tools on the downhill side.



(4) When using handtools, workers SHALL keep at least 10 feet from other workers if possible.

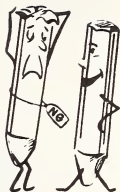
(5) When not in use, tools SHALL be placed against a wall, bank, tree, or stump, or laid down in plain sight, with sharp edges down.

(6) Workers SHALL never throw tools nor use them in such a way that anyone could be injured.



7.11(7)

7.11 (7) Wornout tools, or those needing repair or sharpening, SHALL be segregated from tools ready for use, and adequately signed or locked up to prevent their use.



(8) All tools should be inspected and properly conditioned before use or storage.

(9) Racks and bins for tools SHALL be constructed so that men cannot fall on or collide with sharp edges and so that tools cannot fall out.



7.12 TOOLBOXES

(1) Toolbox SHALL have strong, safe handles, and SHALL be designed for safe placing and removal of tools.

(2) Drop lid SHALL be free from rough or broken edges of sheet metal.

(3) Portable box SHALL be limited to size suitable for safe lifting and handling.

(4) Tools SHALL be stored in such a way that handles will not warp.



7.13 CHOPPING TOOLS--AXES, ADZES, BRUSH HOOKS, HATCHETS, MACHETES, AND PULASKIS

(1) Maintenance:

a. Tool SHALL be ground to safe bevel. Grind slowly toward cutting edge on wet wheel to preserve temper.

b. Tool SHALL be placed in secure position during filing. Use a hand stone to finish after filing.

EQUIPMENT

HANDTOOLS INCL. POWER
236

c. Axes and hatchets that are excessively round cornered SHALL be condemned.

(2) Use:

a. When carrying unsheathed chopping tool, handle SHALL be grasped close to head, with blade parallel with leg, at arm's length and free from body. Never carry on shoulder. Carry on downhill side.

b. Be sure footing is firm.

c. Always chop away from feet, legs, and body. Stand in such a way that, if tool glances, it cannot strike your feet or legs. If it is necessary to swing toward feet or legs, strike blows light so that, if tool glances, you can control it.

d. Employee SHALL--

1. Remove underbrush that might interfere with chopping.

2. Remove overhead branches that tool might hit.

3. Chop only in a natural position where there is sufficient clearance to swing the tool. Never chop crosshanded.

4. Guard against chips hitting the eyes.

5. Use special care when working on hillsides.

6. Watch out for spring when cutting a sapling that is bound down; cut from underneath. Watch for sudden breakage in brittle wood.

7. When standing on logs or springboards, chop only if equipped with nonskid or calked shoes.

e. Chopping tools SHALL not be used as wedges or to drive metal wedges or stakes.

f. Two men SHALL not chop together on a tree less than 20 inches in diameter.



EQUIPMENT

489137 O - 59 - 16

HANDTOOLS INCL. POWER
237

7.13(7)g.

7.13 (7) g. When grubbing with a Pulaski, roots should be cut rather than pulled out.

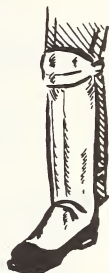
h. In very cold weather, ax should be warmed before use, if possible, to prevent crystallization and chipping of the blade.

i. When lopping limbs from a felled tree, axman should stand on the opposite side from the limb being chopped, cutting toward the top of the tree.

j. On chopping jobs, special foot and shin protection, such as nonskid, steel-capped shoes and shin guards, should be used.

k. Kindling splitters SHALL keep block or log between stick and feet, or hold stick at sides, never with fingers on top. Belt axes should be used for fine splitting.

l. Feet SHALL not be used to hold material being adzed.



7.14 CUTTING TOOLS

(1) HANDSAWS:

a. First cut of handsaw should be made toward you to avoid cutting hand. Guide with thumb placed above teeth of saw.

(2) BOW SAWS:

a. When inserting a blade in a bow-saw frame, workers SHALL keep hands and fingers in the clear when the tension lever snaps into or against the saw frame.

b. When removing a bow-saw blade from the frame, operator SHALL stay in the clear of the blade.



c. Bow saw SHALL be carried over shoulder, blade to rear.

(3) CROSSCUT SAWS:

a. When carrying, saw SHALL be placed on shoulder, teeth outward, hand grasping front handle from underneath saw blade, rear handle off. Teeth guards should be used.

b. Logs lying above the ground should be shored up before they are bucked.

c. When cutting logs, watch out for springing.

d. Logs SHALL not be bucked from downhill side if there is danger of roll.

e. Wedge SHALL be used as soon as saw binds.



(4) DRAW KNIVES:

a. Cutting edge SHALL be sharp, and free of nicks, with handles in place.

b. Material being worked SHALL be at working height, firmly anchored and held steady. Draw knife SHALL not be used on material being braced by worker's knees.



(5) FILES:

a. File SHALL have handle. A knuckle guard should be used for filing against cutting edge.

b. A dull file or one with bent tang SHALL be condemned.

c. File SHALL be kept free of oil or grease.



7.15 MATERIAL HANDLING TOOLS

(1) BARS:

a. Fulcrums and toeholds SHALL be secure, to avoid mashed fingers and toes.

b. When prying, operator SHALL grasp bar to place it, then push with his palms. Foot or other part of body SHALL be kept out of line with bar.

c. Bar SHALL be laid flat and in the clear when not in use on the job, such as alongside materials or at foot of a wall except in desert country where bars heat up.

d. Bent or twisted bars SHALL be discarded.

e. When applying leverages, worker's body SHALL be kept out of danger in case the pry, blocks, or load should slip.



(2) GRUB HOES, MATTOCKS, AND PICKS:

a. Blade SHALL be fixed so that it cannot slide down handle.

b. Workers SHALL spread feet, get secure footing, and grip, then they SHALL keep legs and feet in the clear when swinging.

(3) HAND TRUCKS:

a. Load SHALL be no higher than one can see over.

b. Load SHALL be secure and well balanced.

c. Operator SHALL--

1. Keep feet away from wheels.

2. Keep fingers where they cannot be crushed.

3. Push truck instead of pull it, if possible.

4. Slow down at blind corners and intersections.

5. Place truck clear of passageways when not in use.

(4) JACKS:

a. Jack SHALL be inspected for safe capacity and condition of screws, lift, and safety pawl.

b. Both ends SHALL be examined to make sure they are not bent over or rounded.

c. Jack SHALL be set on solid footing.

d. Load SHALL be centered on jack to prevent load from tipping.

e. LOAD SHALL BE BLOCKED UP BEFORE WORKER GETS UNDER AN OBJECT SUPPORTED BY JACKS.



(5) PIKE POLES:

a. Point SHALL be kept sharp.

b. Keep body balanced when pushing the pole.

c. There should be guards on points when not in use or when being transported.

(6) SHOVELS:

a. Shovel should be kept sharp.

b. It should not be used as a pry bar.

c. Legs should be used as fulcrum.

(7) WEDGES:

a. Steel wedge SHALL be checked for cracks and flaws.

b. It SHALL be properly pointed and tempered, with a 3/16-inch bevel ground around the head.

c. Temper of wedge SHALL be a little softer than that of the sledge being used.



7. 15(7)d.

7. 15 (7) d. Heavy wedge should not be carried in pocket.

e. All mushroomed heads SHALL be reconditioned before use.

(8) WHEELBARROWS:

a. Workers SHALL--

1. Keep back straight and use legs when lifting handles of loaded wheelbarrows.

2. Keep load evenly balanced, with weight well forward to avoid lifting and strain. Push, don't pull, it.

3. Walk, don't run, with a wheelbarrow.

4. Provide enough clearance so knuckles will not get bruised or skinned.



7. 16 STRIKING TOOLS--CHISELS, HAMMERS, MAULS, AND SLEDGES

(1) Wood-handled chisel should be protected with a leather band on the striking end. Wooden or rubber maul should be used.

(2) Head of cold chisel SHALL be ground with a slight radius at first sign of burring or mushrooming.

(3) Nails being driven should be held just under the head and not at the base.

(4) When driving a large bar or other object, other worker SHALL hold it with tongs or holder rather than with his hands. See 7. 33 Goggles.



EQUIPMENT

HANDTOOLS INCL. POWER

(5) A maul SHALL be harder tempered than the wedge, bar, or drill steel to be struck.

(6) When striking, your eyes SHALL be kept on the head of the object being struck. Other workers not using sledge SHALL be at safe distance or they SHALL turn their backs.

7.17 TORSION TOOLS

(1) SCREWDRIVERS:

a. An awl, auger, drill, boring kit, or driven nail should be used for starting a screw.

b. All parts of the body SHALL be kept in the clear in case screwdriver slips.

c. Screwdriver should be right size for screw slot.

d. Screwdriver with insulated handles SHALL be used for electrical work.



(2) WRENCHES:

a. Wrench SHALL be applied to the nut so the wrench handle will turn in the direction in which the jaws point. Face jaws of adjustable wrench in direction of pull.

b. Worker SHALL get firm grip on the work before he pulls hard; then pull toward himself and at right angles to the wrench.

c. A piece of pipe SHALL not be used to increase leverage, nor SHALL a wrench be used as a hammer.

d. Wrench SHALL not be used on material or machine in motion.

e. Pipe wrenches SHALL be used only on round surfaces.



7. 18 POWER-ACTIVATED HANDTOOLS

(1) AIR TOOLS:

a. Operators SHALL wear protective equipment specified for the job.

b. On all air tools on which a replaceable bit or jack set is not retained by a fixture on the tool, a loop of annealed wire SHALL be run around the collar of the bit or jack set, and fastened to the handle of the tool.

c. Hammers SHALL be equipped with safety tool retainers to prevent tools flying from sockets.

d. Tool retainers SHALL be inspected daily for cracks due to vibration.

e. To avoid hazards of flying particles or whipping of air hose, pressure SHALL be released before connections are broken. Air hose SHALL never be kinked to cut off pressure.

f. Operator SHALL be sure that no nearby workers are in line of air flow. Never under any circumstances SHALL an air hose be aimed at anyone.

g. If the tool becomes detached from the air hose under pressure, operator SHALL not try to grasp the hose and kink it. The air SHALL be turned off at the base control valve.

h. Control valve SHALL be closed before air is turned on and SHALL be kept closed until hammer is ready to use.

i. Air SHALL never be used to blow dust or chips from hair or clothing.

j. Line oilers SHALL be placed so that oil cannot drain back into the air tank.

k. When using wagon drill, operator SHALL--

1. Always run tool down when changing angle of drill.

2. Secure wheels and dogs of the wagon drill before starting drill.

3. Stand out of line with a hole that is being airblown.

1. Extra precautions SHALL be observed in sidehill or sloping rock drilling, especially when starting the hole. Temporary scaffolding or other device to give the operator secure footing is important. Footwear SHALL be nonskid. Operator SHALL stand far enough away from tool so that he cannot be injured if it slips.

m. Operator SHALL--

1. Be especially careful when laying hammer down so that trigger cannot be operated accidentally.

2. Loosen tool by rocking back and forth instead of trying to pull it out, if it sticks.

3. Never leave hammer standing when not in use.

n. See 7.33 Goggles, 7.34 Hard Hats, 7.37 Respirators, and 8.55 Compressors.

(2) ELECTRIC TOOLS:

a. Only tools that are supplied with a three-wire cord should be used, with the third wire completing the grounding of the tool through the use of a three-way plug, or a ground wire equipped with a grounding clip attached to an effective ground, such as a water pipe.



(3) POWER SAWS:

a. The manufacturer's operating and safety instructions SHALL be followed unless modified in writing by the supervising officer.



7. 18(3)b.

7. 18 (3) b. When carrying saw, motor SHALL be stopped, and blade SHALL be vertical. One man SHALL carry saw at side with blade to rear; two men SHALL carry saw at side or between them. Tool SHALL be placed in vehicle so it cannot shift in transit. Saw blade should be guarded.

c. Before motor is refueled it SHALL be cooled for about 5 minutes. The fuel tank should be filled on bare ground, and spilled fuel SHALL be wiped off motor. The saw SHALL be started at least 10 feet away from re-fueling area.

d. When starting saw, operator SHALL get good footing, place saw on level ground, put chain out of gear, hold saw with one hand, and pull starting cord away from body, being careful not to wrap cord around hand.

e. Motor SHALL be stopped for all cleaning, adjustments, and repairs to saw or motor.

f. Motor SHALL be started and operated only when all workers are clear of the saw.

g. Wood, magnesium, or soft metal wedges SHALL be used.

h. See 5.22 Tree Felling.





7.2 MACHINE EQUIPMENT

7.21 A. GENERAL

(1) Nobody SHALL stand directly in front or back of a self-propelled machine being started by another.

(2) Employees SHALL--

a. Never go under or in dangerous places around equipment without notifying the operator and being on the lookout for hazards.

b. Never get on or off moving equipment.

(3) Equipment operators and workmen SHALL operate or work with only that equipment to which they have been assigned. See 1.14(10).

(4) Ample clearance SHALL be provided for a man between any solid material and the tail swing of a dragline, shovel, or crane.

(5) Hazards SHALL be investigated and corrected before machines are moved into operating positions. Machines SHALL be located or operated where operators SHALL not be endangered by blasts, cave-ins, or other hazards. Operators SHALL move machines into blasting area only after being instructed to do so by the foreman or blaster in charge.



(6) All engines SHALL be stopped before refueling.



7.21A.(7)

7.21 A. (7) When filling a gasoline tank, the funnel or container SHALL be kept in contact with the gasoline tank, to avoid the possibility of a static spark igniting the gas.



(8) Heavy-equipment operator should have a helper to assist with work when necessary.

(9) When changing operators, the man in charge SHALL discuss with the new operator and the crew the plan of work, the existing hazards, the hand signals, and other safety features of the job.



(10) Any machine with parts that are lowered by gravity, such as shovels, buckets, bulldozer blades, and skip loaders, SHALL be left only with the movable part resting on the ground.

(11) Fire extinguishers SHALL be provided where machine hazards warrant them, such as on asphalt distributors.



(12) Also see 7.3 Safety Equipment, 8.5 Repair Shops, 3.3 Flammables, and 6.6 Rigging.

B. INSPECTION

(1) WHEN MACHINERY OR EQUIPMENT (INCLUDING THAT UNDER CONTRACT) IS RECEIVED, REMODELED, OR REPAIRED, IT SHALL BE

EQUIPMENT

MACHINE

INSPECTED FOR SAFE OPERATING CONDITION BY A QUALIFIED PERSON BEFORE IT IS TURNED OVER TO THE OPERATOR.

(2) Operator SHALL currently inspect his machine for safe operating condition and promptly notify his superior officer of needed repairs.

(3) Where safety of operator, crew, or equipment is concerned, defective machinery SHALL be shut down until repairs are made. Before it is placed back in service, it SHALL be inspected as outlined in 7.21B(1).

C. GUARDS AND SAFETY DEVICES

(1) All gears, sprockets, drive belts or chains, pulleys, drums, gears, fans, or other hazardous moving parts SHALL be provided with guards where practical to do so.

(2) Guards SHALL not be removed or made ineffective except while making repairs.

(3) Power for the machine SHALL be shut off until repairs are made and guards replaced.

(4) Sawmills SHALL be provided with guards for belts, saw, and carriage.

(5) Operating platforms surfaced with non-skid material, footwalks, ladders, steps, handholds, guardrails, and toeboards necessary for safe operation SHALL be installed before operating the machine.



7.21C(6)

7.21 C. (6) Suitable protection against falling objects, swinging loads, and similar hazards SHALL be provided for the operators.

(7) Safety glass SHALL be used in shields, cabs, or enclosures on machines.

(8) Motor SHALL not be operated in any idling equipment except to furnish heat to prevent freezing of operator, and then only with window open.



D. SIGNALING

(1) A competent signalman SHALL be posted at dangerous or congested points, near crews or blind areas.

(2) Only one man SHALL give signals.

(3) The right use of hand signals SHALL be observed. Make sure that signals and instructions are clearly understood.

(4) Signalman SHALL get as close to operator as safety permits so operator can clearly see movements of signals.

(5) All signal motions SHALL be big so that operator can understand signals. Repeat frequently.

(6) When slow pull or easy move is wanted, signal motions SHALL be made at slow tempo; signal motions SHALL be faster for fast pulls or moves.

(7) These signals SHALL be observed when directing vehicular or construction equipment, except when standard industrial specialized signals are agreed upon and understood in advance:

a. Move Forward: Pull motion, one hand.



b. Move Backward: Push motion, one hand.



c. Turn Around: Circle one hand above head.



d. Slack Up: One arm in front, hand moving up and down.



EQUIPMENT



MACHINE

e. Raise: Raise one hand,
palm up.



RAISE

f. Lower: Lower one hand,
palm down.



LOWER

g. Stop: One arm raised,
palm forward.



STOP

E. TRANSPORTATION

(1) Before heavy machinery is moved, route of travel SHALL be checked for hazards, such as overhead and side clearance, culverts and bridges, and overhead high-tension lines.

(2) Operator SHALL know load weight, width, and height; obtain State permit; comply with the State requirements of flagging and signaling.

(3) Before heavy equipment is hauled on a truck with false bed, the false bed SHALL be removed or securely bolted to truck bed to prevent slipping on steep hills.



EQUIPMENT

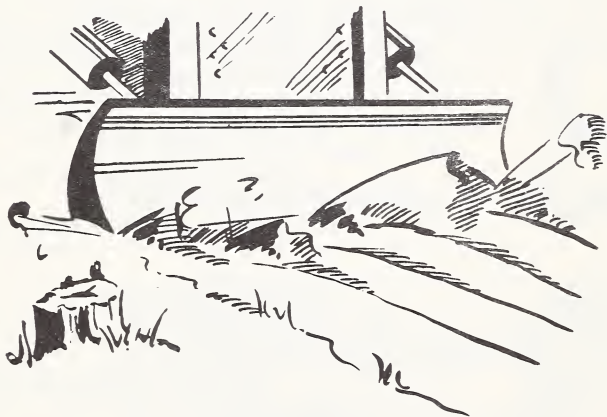
MACHINE

(4) Heavy equipment SHALL be blocked sidewise and lengthwise on truck beds. It SHALL be securely bound to the truck bed both front and rear or on each side, with chain or cable and tightened with load binders also.

(5) Tractor blades SHALL be angled, removed, or a special permit secured, as necessary to comply with State laws pertaining to width of clearance.

(6) Loose tires, planks, or other heavy material SHALL not be left in the path of moving equipment.

(7) See also 2.1 Car Travel.



7.22 TRACTORS

A. GENERAL

(1) Injuries from tractor operation are usually very serious, often fatal. For this reason DEFENSIVE OPERATION SHALL BE PRACTICED ALL THE TIME. This means--

a. UNDERSTANDING THE EQUIPMENT AND ITS LIMITATIONS.

b. Accepting competent advice.

c. OPERATING WITH ACCIDENT PREVENTION ALWAYS IN MIND.

d. Avoiding doubtful or spectacular operations.

(2) Only qualified operators SHALL be allowed to drive.

a. Apprentices SHALL operate a tractor only under the immediate supervision of a skilled operator.

b. No one except a trainee or mechanic engaged in actual repair SHALL be permitted to ride on the seat with the operator, and then only if the slope is less than 30 percent, except when essential in fire emergencies.



(3) Hand holds should be installed on seat frame, fuel tank frame, or hydraulic-jack assembly, to assist driver in mounting and dismounting.

(4) Heavy mesh screen should be installed on rear of cab protector between operator and rear-mounted towing winch, to protect the back of the operator.



EQUIPMENT

MACHINE

(5) Operator SHALL know whereabouts of all people nearby.

(6) Tractor SHALL not be operated if any part of the control, hoist, or hydraulic system, including steering and brakes, is not in safe operating condition. Foreman or mechanic SHALL be advised if tractor is unsafe.

(7) Before starting the engine, transmission SHALL be in neutral, master clutch disengaged, and blade down.

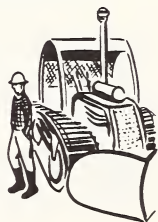
(8) All workmen SHALL keep clear of a tractor in motion. To stop operator, signal from a safe distance.

(9) When motion is stopped and engine is idling, the transmission SHALL be in neutral and the master clutch engaged, so tractor cannot be jarred into motion.

B. DRIVING

(1) The master clutch SHALL be engaged gently, especially when going up a hill or pulling out of a ditch.

(2) Operator SHALL --
a. LOOK OVER THE GROUND TO BE TRAVELED AND JOB TO BE DONE. WHERE IT CANNOT BE CLEARLY SEEN FROM THE DRIVER'S SEAT, HE SHALL DISMOUNT AND EXAMINE IT BEFORE PROCEEDING, UNLESS HE HAS A SPOTTER TO GUIDE HIM. AVOID SETUPS FOR UPSETS.



7.22B.(2)b.

b. Be extra careful around overhanging rocks, on rock slides, and near dead trees.

c. USE EXTREME CAUTION IN GOING OVER OBSTACLES WHEN HEADED DOWNHILL. HE SHALL BE SURE THE SLOPE IS SAFE AND SHALL DRIVE CAREFULLY.

d. OBSERVE AND COMPLY WITH SAFE LIMITS OF TRACTOR OPERATION ON SIDE SLOPES, REMEMBERING THAT WHEEL TRACTORS OVERTURN EASILY.

e. Reduce speed before making a turn or applying brakes. If the speed of a tractor is doubled, the danger of overturning is increased four times.

(3) When on steep side slopes operator SHALL--

a. Guard against running over rocks with upper track or wheels.

b. Keep off solid rock faces.

(4) The transmission SHALL be in gear when tractor is going down steep grades.

(5) If tractor slides sideways, usually uphill track should be locked and the machine turned immediately.

(6) Turns SHALL be made so that operator is on uphill side if possible.

(7) When the towing winch is in operation, hands SHALL be kept free from the cable and working parts.

(8) Dozer blade SHALL be lowered whenever operator dismounts.

EQUIPMENT

MACHINE

C. HITCHING AND TOWING

(1) A bar or stick SHALL be used to steer coupling bar into drawbar jaws.

(2) Nobody SHALL be allowed to ride on the drawbar, bulldozer blade, frame, or materials or equipment being pulled, unless his presence is necessary for operation of the unit and a seat is provided thereon. Dragged logs, roots, stumps, rocks, or other material SHALL not be ridden.



(3) Operator SHALL look behind before backing up to slack the chain or cable. Slack in the chain or cable SHALL not be taken up with a jerk.

(4) When hooking towline to the front pull hook, the blade SHALL be rested on the line on soft ground or on a block or rock; then worker SHALL climb over the blade to attach the line.

(5) Hookers and groundmen SHALL stand clear of all chains and lines and SHALL stay away from the tractor, at least the length of the towline.

(6) For work near any electric powerline, the length of cable attached to the load SHALL be at least 10 feet shorter than the distance from the tractor to the powerline, so that it cannot strike the line.



7.22C.(7)

7.22 C. (7) Tractor SHALL be operated so that it does not nose up or tip when pulling a heavy load up-grade or slide sideways when pulling around a side hill.

(8) Tractor SHALL be stopped out of gear and the brake set before the load is released.

(9) When skidding with a tractor--

a. Each morning and after each hard haul, tractor operator and choker setter SHALL inspect equipment, including rope and eye splices on winch, choker eye splices, and ferrules.

b. After chokers are set, choker setter SHALL get out of danger where he can see the operator, and vice versa, at all times. Both SHALL watch for falling trees and limbs and warn each other of dangers.

c. Choker setter SHALL stay at least 10 feet behind the load.

D. TRACTOR ADJUSTMENTS

(1) Towing winch SHALL be adjusted only when the motor is stopped. For adjustments requiring the motor to be in operation, the transmission SHALL be in neutral and the master clutch SHALL be engaged.

(2) Before working on the towing winch, the dozer moldboard and the scraper bowl SHALL be lowered to the ground.

(3) No one SHALL get under an unblocked, raised blade for any purpose.



E. SCRAPERS, CARRYALL

(1) When changing the cutting edges or working underneath the scraper, the bowl SHALL be blocked up to prevent it from dropping.

(2) Blocks SHALL be placed between the apron arms and scraper sides before work is done under the apron.

(3) Hands SHALL be kept free from the cable, sheaves, and linkage while the unit is in operation.

(4) Leather-faced gloves SHALL be worn when handling cable.

(5) When traveling down a steep hill, operator SHALL be ready to drop the cutting edge to the ground to serve as a brake if the scraper should start to jackknife or get out of control.

(6) Weak or frayed cable SHALL be replaced immediately.



F. TIMBER OPERATIONS

(1) TRACTORS AND BULL-DOZERS USED IN DANGEROUS, TIMBERED COUNTRY OR IN PLACES WHERE THERE IS DANGER OF FALLING OBJECTS SHALL BE EQUIPPED WITH CANOPIES OR ROLLOVER BARS WHICH WILL PROTECT THE DRIVER.



EQUIPMENT

MACHINE

7.22F.(2)

7.22 F. (2) BEFORE OPERATING ALONE, DOZER OPERATORS SHALL BE THOROUGHLY INSTRUCTED IN THE SKILLS OF PUSHING OVER TREES.

(3) OPERATORS SHALL LOOK OVER THEIR AREAS FOR HAZARDS SUCH AS DANGEROUS SNAGS AND GREEN TREES, TREES UPROOTED WHILE PILING BRUSH, ETC.

G. TERRACING OPERATIONS

(1) Apprentice or trainee operators SHALL not be allowed to operate a tractor on terracing work.

(2) When more than one tractor is working on a project, their operations SHALL be so organized that one tractor SHALL not be working directly below another.

(3) A safety scout SHALL be provided where ground visibility is poor because of dense brush or weeds.

(4) Heel trenching with lower corner of blade SHALL be limited to slopes not exceeding 35 percent.

(5) In moving downhill from one terrace to another, the operator SHALL lower the dozer and back the tractor downhill.

(6) If the slope is steeper than 65 percent, the operator SHALL build a road from one terrace to another.

(7) Tractor operations SHALL be suspended after storms until good traction is assured.

7.23 END LOADERS--THEY TIP OVER EASILY BECAUSE OF HIGH CENTER OF GRAVITY.

(1) Only the operator and his apprentice SHALL ride on seat of vehicle, and then only when supervised by a competent foreman.

(2) Operator SHALL be sure wheels or tracks are on firm ground.

(3) Load SHALL be picked up under center of its weight if possible.

(4) Machine SHALL not be moved until safely loaded.

(5) It SHALL be started and stopped slowly when raising, lowering, and traveling.

7.24 GRADERS--MOTOR OR PULL TYPE

A. GENERAL

(1) OPERATORS SHALL BE ALERT TO DANGER FROM FATIGUE DUE TO MONOTONY OF THE JOB.

(2) Foremen SHALL allow only competent operators to drive. Beginners SHALL operate only under the immediate supervision of a skilled operator.

(3) Machine SHALL never be backed until operator is sure that there are no hazards. Rearview mirror SHALL be used.



7.24A.(4)

7.24 A. (4) The end of the blade that is on the traffic side SHALL be pointed to the rear and away from the direction of travel.

(5) Get on and off a grader only when it is stopped.

B. PUBLIC PROTECTION

(1) "Men and Equipment Working" signs or red flags SHALL be posted on road section being worked if traffic warrants this, to warn and protect forest users.



(2) When graders are moved over public roads--

a. State requirements as to lights, brakes, licenses, etc. SHALL be observed.

b. It is safer if the back side of the moldboard is facing ahead.

c. The moldboard SHALL be angled enough so that both ends are within the width limits of the tires.

d. Red flags or lights should be mounted on the front and rear of all operating graders.

e. On narrow roads operator SHALL stop to let oncoming traffic pass.

(3) Blading should be so planned that the blading on each section will be completed each day. Where a windrow must be left overnight, warning signs or lights SHALL be placed to warn motorists.

C. OPERATION

(1) ONLY THE OPERATOR SHALL BE ALLOWED ON THE MACHINE WHEN IN MOTION. Exceptions:

EQUIPMENT

MACHINE

a. When operator is instructing a trainee.

b. Foreman may ride to direct work on fine finishing of bank slopes or close grading.

(2) Operators SHALL--

a. Keep cab ventilated to avoid effects of exhaust fumes. Exhaust tailpipe should be set at an angle of 45° to right or left of line of travel.

b. Adjust levers or controls direct. Never reach through steering wheel to do it.

c. Watch the road for hazards. Dismount and look things over carefully if you cannot see clearly.

d. Pull rather than push logs and windfalls out of the road where there is danger of them sliding or rolling on the machine.

e. ALWAYS TRAVEL AT A SAFE SPEED REGULATED TO ROAD AND WEATHER CONDITIONS.

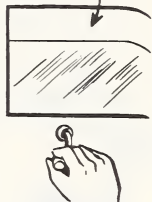
f. Grade slowly enough to prevent the machine or yourself from being thrown out of control if it strikes roots, rocks, or stumps.

g. Only on rare occasions operate the grader on any work at speeds exceeding 5 or 6 miles per hour.

h. Be sure all of the crew is in full view before starting and that men do not get too close to machine when in motion.

i. Shift into lowest gear necessary to climb or descend a grade.

OPEN WINDOW



7.24C.(2)j.

7.24 C. (2) j. Maintain control on hills by keeping machine in gear; never coast out of gear. Do not depend entirely on brakes to hold grader while traveling, working, or when parked.

k. Keep graders away from edge of road on fills with soft shoulders.

l. In bank sloping, watch above the cut for rocks, logs, and trees that may roll when loosened by the blade action.

m. When turning a patrol grader, point the front wheels toward the fill shoulder.

n. When backing up older machines remember that brakes do not hold so well in reverse as when going forward.

D. MAINTENANCE

(1) Motor SHALL be stopped, and can or pump nozzle SHALL touch the intake when filling fuel tank.

(2) Before working on the machine, employee SHALL set brakes, drop blade, stop motor.

(3) Before checking the blade bolts, follow (2) above, and put block under blade.

(4) Oil leakages on cab floors SHALL be corrected and floors cleaned before operating.

7.25 SHOVELS AND CRANES

A. PLACEMENT

(1) If machine is placed near an excavation, shoring and bracing SHALL be installed to prevent a cave-in. Otherwise machine SHALL be kept back from the edge, a distance at least equal to depth of excavation.



EQUIPMENT

MACHINE

(2) Machine SHALL be placed on as level ground as possible. If necessary to use cribbing or shims to level it, be sure they are sturdy and will not overturn or shift. The machine SHALL be well blocked to prevent roll or sinking after being placed in position.

(3) When operating a pneumatic-tired self-propelled machine, outriggers SHALL be used to stabilize the unit when necessary.

B. OPERATIONS

(1) A shovel or crane SHALL be operated only by a qualified operator. Exception: An apprentice SHALL perform operations only under the direction of an experienced operator.

(2) Operator SHALL--

a. WEAR CLOSE-FITTING CLOTHING LIKE COVERALLS, AND NONSKID SHOES.

b. Permit only mechanic, inspector, or apprentice operator in cab while machine is in operation.

c. Give signal and wait until everyone is in the clear before hoisting materials.

(3) Operator SHALL hoist only those loads well within the rated crane capacity. When lifting heavy loads, a 2-, 3-, or 4-part line SHALL be used to keep within the rated capacity of



EQUIPMENT

MACHINE

7.25B.(3)

the hoisting cable. A data sheet showing operating ranges and capacity ratings with boom at various angles should be posted in the cab.



(4) Booms and cables SHALL not be overloaded.

(5) The distance between operations and live high-tension lines SHALL be the length of the boom plus the length of the material being carried. This does not apply when power has been cut off. See 8.24(3).

(6) If boom should come in contact with overhead wires carrying electrical current, operator SHALL--

a. Stay on machine until boom is cleared or the current is cut off.

b. Keep everyone on the ground away from the machine.

c. Jump if you must leave the machine. Do not step off.

(7) Hands SHALL be kept clear of moving cables and other moving parts.

(8) All slings, ties, and hooks SHALL be safely placed and secured before material is hoisted.

(9) EVERYONE SHALL BE KEPT AWAY FROM DIPPER, BOOM, OR LOAD BEING OPERATED OR MOVED. HANDLINES SHOULD BE USED FOR GUIDING LONG MATERIALS.



(10) Men SHALL not go under idle dipper or boom because it might drop, due to cold or damp brakes.

EQUIPMENT

MACHINE

(11) Men SHALL be kept away from tail swing.

(12) Trucks SHALL be loaded only when they are safely placed and the driver is out of the cab and in the clear.

(13) Load SHALL be swung over rear of truck and not over cab, when possible.

(14) Machine SHALL be mounted only when it is not moving.

(15) Everyone SHALL be in the clear before machine is backed up or moved.

(16) The master clutch SHALL be disengaged before leaving the cab temporarily.

(17) Power SHALL be shut off, controls locked, and movable parts secured before leaving the cab for the day.

(18) The dipper or other load SHALL rest on the ground before leaving the cab. Never leave it suspended.

7.25 C. MAINTENANCE

(1) All cleaning, greasing, oiling, and repairing SHALL be done with the engine turned off,



7.25C.(1)

if possible, and with all movable parts secure. If necessary to leave the engine running, the master clutch SHALL be disengaged, and a "DO NOT OPERATE" sign SHALL be put near the controls.

(2) Leaking feed lines and fuel tanks SHALL be repaired promptly.

(3) Machine SHALL be maintained in safe operating condition, including the controls, cable, and brake system.

(4) Iron floor plates, walkways, and ladder used for oiling or making repairs SHALL be kept in safe condition and free of ice, mud, oil, or grease.

(5) Cables SHALL be inspected each day for ravel or breaks. Cable clamps SHALL be kept tight and free of slippage.

D. TRANSPORTING

(1) Boom SHALL be lowered so that tip is no higher than the cab, if feasible. If machine is provided with a cradle or rack for supporting boom, it SHALL be used.

(2) A flagman SHALL be used when there are hazards to the operator or other persons.

(3) Operator SHALL watch for overhead obstructions, such as underpasses, low-hanging limbs, or wires.

(4) Free rolling or coasting with traveling gear disengaged SHALL not be done.

7.26 CRUSHERS

A. GENERAL

(1) Crusher operation SHALL be permitted only under the supervision of a qualified employee whose only duty is plant supervision.

(2) A safety operating plan SHALL be made, posted, and maintained at the crusher.

(3) See also 6.5 Ladders and Scaffolds.

B. CONSTRUCTION

(1) Safety switch or remote control to the switch SHALL be provided for stopping motor in an emergency. It SHALL be placed preferably near the chute to crusher jaw.

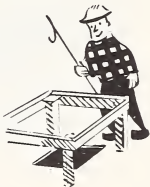
(2) All walkways, ladders, and guards SHALL be constructed of sound materials and completed before the plant is operated.

(3) Feed platform SHALL be level and surfaced with nonskid material, such as rough lumber.

(4) Periodic inspection SHALL be made of all construction, for evidence of possible structural failures.

C. OPERATION

(1) When operating crusher from platform above, crusher opening SHALL be provided with a guard large enough for entrance of rock of crusher size but small enough to give protection against workers falling into the opening.



EQUIPMENT

MACHINE

7.26C.(2)

7.26 C. (2) A rock hook SHALL be used to feed, turn, or remove rock from the crusher.

(3) When belts are removed or replaced, power SHALL be shut off.

(4) Machinery SHALL be motionless before it is cleaned, serviced, or repaired.

(5) In portable crusher operations--

a. Power SHALL be stopped before obstructions are removed.

b. Employees SHALL not stand on or close to the flexible power drive mechanism.

7.27 BRUSH CHIPPERS

(1) The chipper operator SHALL be responsible for safe operation of the chipper. All workmen on the chipper crew will be subject to his instructions pertaining to safety.

(2) Long-sleeved shirts and wristlet-type gloves SHALL be worn at all times by those feeding the machine. Dust masks should be worn where conditions warrant it.

(3) The drive motor SHALL be stopped before adjustments or repairs to the chipper are made.

(4) The operator SHALL not allow anyone to stand directly in front of the exhaust chute while the cutterhead is in motion.

(5) Not more than two men SHALL feed the chipper. If necessary to stand closer than 6 feet from the hopper, only one man SHALL feed it, and he should do so from the side. No one SHALL reach in throat of operating chipper.

(6) Only limbs between 2 feet and 6 feet in length should be chipped. Dry and excessively crooked pieces should be left out. Short pieces SHALL be fed into the chipper with a longer piece.

(7) Material SHALL be thrown into the hopper butt end first.

(8) A pusher stick or another limb SHALL be used to clear the hopper.

(9) Diameter of limbs to be chipped is governed by the size of chipper being used. Operator SHALL not overload it.

(10) When adjusting blades, cover sharp blade below one being adjusted with section of split hose, because space and tools are too small to safely use gloves.

(11) Pitch and sawdust accumulations SHALL be thoroughly cleaned from seating surfaces of cutterhead and wedge blocks when blades are being changed.

(12) Wedge bolts and adjusting bolts SHALL be tightened in accordance with the manufacturer's specifications. They SHALL be rechecked before the machine is started in the morning and at noon.

(13) After blades are changed and adjusted, the cutter knife SHALL be rotated once by hand to make sure that all blades clear the bed knife.

(14) After a blade change, the crew SHALL stand well back from the machine while the operator brings the cutter head to operating speed slowly by engaging and disengaging the clutch. The machine SHALL be run at operating speed for a few minutes, and then stopped and the blade wedge bolts rechecked for proper tightness.

7.28 (1) COMPRESSORS. --See 8.55.

(2) JACK HAMMERS. --See 7.18(1).

(3) MACHINE TREE PLANTING. --See 5.27.







7.3 SAFETY EQUIPMENT

7.31 GENERAL

(1) All woods workers SHALL provide themselves with nonskid shoes, snug-fitting clothing, cuffless, snag-proof, and tear-resistant trousers, gloves, long-sleeved shirts.

(2) Employees working in shops and around machinery in motion SHALL wear snug-fitting clothing such as coveralls, fastened from top to bottom, with sleeves snug at wrist or cut short, and nonskid shoes. They SHALL remove neckties, gloves, rings, or ragged clothing.

(3) Employees SHALL be furnished with one or more of the following where there is danger of irritant or toxic substances coming in contact with the skin or clothing:

a. Protective clothing. --
Gloves, helmets, goggles, respirators, leg and footwear.

b. Protective ointment for exposed skin areas.

c. Necessary facilities and solvents, soap, and hot water, for removal of toxic and poisonous substances.

d. First aid equipment.

e. Snakebite kits in snake-infested country.



7. 32 FOOT AND LEG GUARDS, SAFETY SHOES

(1) They should be worn where there are hazards from--

a. Falling objects such as stone, rocks, or timber.

b. Sharp-edged tool cuts such as the adz, ax, broadax, brush hook.



7. 33 GOGGLES

(1) Workers SHALL wear goggles, safety spectacles, face shields, or welder helmets to protect their eyes from--

a. Small flying particles when cutting, drilling, scaling, and grinding metals, cutting, chipping, or dressing stone and brick, wood-working, overhead pruning, brushing, and machine planting.

b. Flying objects when hand drilling, chipping, calking, riveting, quarrying, rock cutting and crushing or when using a cyclone seeder or brush cutter.

c. Concentrations of cement or other dust, or dust and sand when sandblasting.

d. Hot metal when handling babbitt or pouring lead joints, or shaping metal on an anvil.

e. Gases, fumes, and liquids when handling acids and caustics, such as sulfuric or muriatic acids, ammonia, or creosote.



f. Injurious reflected light or glare such as snow exposure (colored glasses).

g. Injurious radiant energy and flying hot particles.

1. When using gas cutting and welding torches, goggles SHALL be light-proof around the edges, ventilated, and fitted with lens of shade #4 for cutting, light welding and brazing; shade #5 for medium and heavy welding; and shade #6 when greater density is needed.

2. When using electric arc welder, welders SHALL wear welder helmets fitted with lens of shade #10 for ordinary metallic welding; shade #12 for carbon arc and heavy metallic welding.

3. Foremen and helpers SHALL wear shade #5 or #6 to protect them from indirect flashes of electric arcs.

4. Approved welder helmets with safe shade lens can be used in lieu of goggles. In either case they SHALL be frequently inspected and overhauled as needed.

5. Welders wearing glasses should be provided with approved welder helmets in lieu of goggles, to prevent glasses from steaming.



CHIPPING



**DRILLING OR
ROUTING**

(2) Goggle wearers should--

a. Keep goggles in protective containers.

b. Wipe the lens frequently with a clean cotton cloth or soft tissue.

c. Keep goggle frames, including side screens, free from dust and grit.



7.33(2)d.

7.33 (2) d. Change headbands frequently, keeping the webbing flat.

e. Treat lenses to prevent fogging when necessary, or use goggles ventilated around the lenses.



PORTABLE GRINDER

7.34 HARD HATS

(1) HARD HATS SHALL BE WORN--

a. WHERE THERE IS DANGER FROM FALLING OR FLYING OBJECTS SUCH AS ROCKS AND FROM TREES, LIMBS, HAZARDOUS EXCAVATIONS, BUILDING AND ROAD CONSTRUCTION JOBS, MACHINE PLANTING, BRUSH CHIPPING.

b. IN FELLING TREES AND SNAGS, WHEN THERE IS DANGER OF LOOSE BARK, LIMBS, WEAK TOPS, OR BURNING BARK OR CHUNKS FALLING WHEN TREE IS ON FIRE.

c. BY RIGHT-OF-WAY CLEARING CREWS AND DOZER OPERATORS IN LARGE OR DANGEROUS TIMBER.

d. By blasters and powder men.

e. By fire fighting personnel working where there is danger from rolling rocks, logs, falling limbs.



(2) Headband and hammock SHALL be adjusted to fit snugly, with an air space of 1/2 inch or more between the head and top of crown of hat.

(3) Headband and hammock can be sterilized by thorough cleansing with detergent powder or saddle soap, followed by exposure to sun for 10 hours.

7.35 LIFE PRESERVERS

(1) Persons engaged in work where there is danger of falling in deep or swift water, SHALL be provided with suitable lifelines, vest-type life preservers, lifebelts, or liferings.

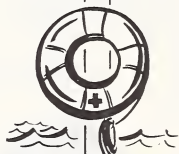
7.36 PARACHUTES--See 2.25.

7.37 RESPIRATORS

(1) Chemical respirators SHALL be worn by persons exposed to harmful materials when fumigating, and to toxic fumes around chemicals, and when repairing or servicing equipment such as crushers under dusty conditions.

(2) Dust respirators SHALL be worn by workmen exposed to excessive dust caused by such work as quarrying, tunneling, rock crushing, stone power saws, jack hammer operation, cement work, sandblasting. They SHALL be worn also for certain types of road work, such as tractor or grader operations in light, dusty soils.

(3) Paint respirators SHALL be worn by workers using paint spray guns.



7.37(4)

7.37 (4) Respirator wearer SHALL--

- a. Be sure respirator fits face snugly.
- b. Inspect and sterilize respirator frequently. Wash it with soap and water to remove any corrosive material, such as oil, grease, or solvent on the rubber parts. Keep the filter or cartridge dry.
- c. Renew filters before they clog with dirt.
- d. Frequently replace dirty cloth face pieces with clean ones.
- e. Renew chemical cartridges as soon as objectionable odor is noticeable.
- f. Store respirator in a clean box away from heat and moisture.

7.38 RUBBER GLOVES

(1) These SHALL be worn where there is danger of electric shock or when handling toxic materials.

(2) Gloves SHALL be inspected and given the air test before they are used. Inspect gloves before use, then at 30-day intervals during use.

(3) Gloves SHALL be peeled off, instead of pulling on their fingers.

(4) Leaky gloves SHALL be destroyed, never patched.

7.39 SAFETY BELTS, ROPES, AND NETS

(1) These SHALL be provided and used to protect employees working from unguarded surfaces above ground, over excavations, moving

EQUIPMENT



SAFETY

machinery, or dangerous waters, on steep slopes, or otherwise where individuals are subjected to falls hazardous to life and limb.

(2) They SHALL be inspected for worn, dry, hard leather; pliability; worn or broken stitching; cuts; cracks; loose rivets; worn buckles, snaps, rollers, tongues, and D-rings.

(3) Safety belts and straps SHALL never be spliced or weakened by punching extra holes.

(4) Safety ropes SHALL be checked frequently for broken fibers. To check, twist the strands back.

(5) When available, safety seat belts SHALL be worn at all times when operating a motor vehicle or as a passenger, regardless of the distance to be traveled or the time involved.



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	Sparks	Hot Materials	Heat	Hot Liquids	Moisture	Acids and Alkalis	Slips and Falls	Falling Objects	Flying Particles	Electric Shock	Cuts and Abrasions	Dermatitis	Explosives	Machinery	
HATS, CAPS HELMETS	X	X	X												Asbestos
	X			X	X	X				X		X			Plastic-Rubber
	X	X										X		X	Cotton-Wool
	X							X	X		X				Metal
								X	X	X	X				Plastic
COATS, APRONS	X	X	X												Asbestos
WAIST PROTECTION	X	X		X					X		X				Chrome Leather
				X	X	X				X		X		X	Plastic
				X	X	X				X		X		X	Rubber
									X		X				Canvas-Fiber
SLEEVES WRISTLETS	X	X	X												Asbestos
	X	X		X					X		X				Chrome Leather
	X	X	X						X					X	Flameproofed Duck
				X	X	X									Plastic
				X	X	X									Rubber
GLOVES MITTENS HAND PADS FINGER GUARDS	X	X	X												Asbestos
	X	X		X					X		X				Chrome Leather
				X	X	X				X		X			Rubber
				X	X	X						X			Plastic-Rubber Coated Fabric
											X				Metal Mesh
											X				Cotton-Canvas
PANTS, KNEE PADS, LEGGINGS	X	X	X												Asbestos
	X	X		X					X		X				Chrome Leather
	X	X	X						X					X	Flameproofed Duck
	X							X	X		X			X	Fiber-Metal
				X	X	X						X			Plastic
				X	X	X				X		X			Rubber
SHOES BOOTS									X		X			X	Steel Toe Caps
					X		X								Non-Skid Shoes
		X	X	X	X	X	X				X				Woolen Soles
	X	X	X	X											Chrome Leather
			X	X	X					X		X			Rubber
													X		Conductive Rubber

CHAPTER 8

BUILDINGS AND GROUNDS

LEGEND

CAPITALIZED TEXT--somebody was killed by not observing these practices.

SHALL--denotes a mandatory requirement.
The SHALL's are capitalized for easy reference.

SHOULD--denotes a recommended practice.

**It is the duty of each of us
to prevent accidents - and to
protect himself and others
from injury**



CHAPTER 8. BUILDINGS AND GROUNDS

CONTENTS

SUBJECT	Page	SUBJECT	Page
8.1 COLOR CODE		8.3 LABORATORIES AND	
Color Identifica-		CHEMICALS	
tion Marking ...	285	General	299
Safety Green ..	285	Laboratory Work	299
Alert Orange ..	285	Job Planning	300
High Visibility		Storage and	
Yellow.....	286	Transit.....	301
Fire Protection		Mixing and Using	302
Red	287	Disposal of Chem-	
Precaution Blue	287	icals and Con-	
Radioactivity		tainers	303
Violet	288	Chemicals Used	
Car Colors....	288	in Our Work....	305
Traffic White,		8.4 OFFICES AND	
Grey, Black ..	288	DWELLINGS	
Walls, Ceilings	288	Mandatory Office	
Fixed Shop		Requirements ..	311
Equipment ...	288	Recommended	
Piping Systems	289	Office Practices	312
Color Standards .	289	Hot Water Safety.	313
Fluorescent Signs	289	Gas, Oil, Kero-	
Safety Signs	289	sene Space	
Danger	290	Heaters.....	314
Caution.....	290	8.5 REPAIR SHOPS	
Instruction....	290	General	315
Direction	290	Car Servicing	
Information ...	290	and Repairs....	316
8.2 ELECTRICITY		Use of Solvents ..	318
General	291	Battery Servicing	318
Installation and		Compressors....	319
Repair.....	291	Steam Hose	320
Equipment	294	Monoxide Gas ...	321
Power Line		8.6 WAREHOUSING	
Rules.....	295	General	323
Rescue	298	Lifting	324

CONTENTS--Continued

SUBJECT	Page	SUBJECT	Page
8.6 WAREHOUSING--		8.7 WOOD AND METAL	
Cont.		SHOPS--Cont.	
Stairways and		Woodworking Shop--	
Floors.....	326	Cont.	
Material Handling	326	Drills and	
Good House-		Borers 334	
keeping.....	328	Sanders..... 335	
8.7 WOOD AND METAL		Wood Lathes . 335	
SHOPS		Machine Shops.. 335	
General	329	Grinding	
Woodworking		Wheels 335	
Shop.....	331	Buffing Wheels 337	
Shapers.....	331	Metal Lathes,	
Jointers	331	etc. 338	
Planers, etc. .	332	Hydraulic	
Circular Table		Presses 339	
Saws	332	Drill Presses. 339	
Swing Cutoff		Trip Hammers 339	
Saws	333	Power Punches	
Band Saws	333	and Shears ... 339	





8.1 COLOR CODE

8.11 COLOR IDENTIFICATION MARKING--These standards SHALL be used to identify safety equipment, accident hazards, and warnings; and to assure orderly arrangement, including good housekeeping.

(1) SAFETY GREEN.--For safety equipment, such as--

- a. Medicine cabinets.
- b. First aid kits.
- c. Safety bulletin boards.
- d. Safety instruction signs.
- e. Starting buttons on machines.
- f. Clean rag containers.
- g. Safety showers.
- h. Emergency equipment, such as stretchers, gas masks, and respirator containers.



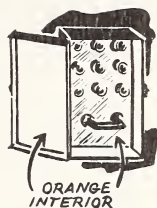
(2) ALERT ORANGE.--To identify extreme hazards and for dangerous parts of equipment that can crush, cut, or electrocute. More attention value than any other color. Use on--

- a. Stop buttons on machines.
- b. Exposed parts of turning wheels, rims, edges of pulleys, wheels, sprockets, gears, and chains.
- c. Narrow strip on cutting edge of cutting devices and rollers.
- d. Moving control wheels and levers on lathes, drill presses, etc. Paint only spokes of control wheels.



8.11(2)e.

8.11 (2) e. Interior surfaces of electrical switchboxes and fuse box covers, switch handles, power boxes, and machinery guards to suggest replacement of cover.



f. Containers for explosives or highly combustible materials, and greasy rags.

(3) HIGH VISIBILITY YELLOW. --To mark physical obstacles, such as striking against, stumbling, falling, caught between, and tripping hazards. Highest visibility of any color under nearly all light conditions. Parallel bars of yellow and black have unusually strong attention value. Use on--

a. Construction equipment, such as bulldozers, tractors, graders, and carryalls.

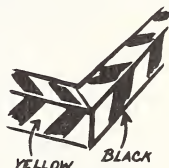
b. Movable objects, such as floor or overhead cranes, floor jacks, stands, hydraulic hoists, chain hoist blocks and hooks, and loading buckets.

c. Edges of unguarded platforms, wells, open pits, and aisle markings around hazards.

d. Projections, protruding parts, low beams and pipes, low or impaired clearances, and coverings or guards for guy wires.

e. Conveyor parts or other fixtures suspended at hazardous levels from ceilings or walls and extending into normal operating areas.

f. Elevation changes, such as stairway approaches, top and bottom steps, risers of off-standard steps, raised door sills, and curbing.



g. Pillars, posts, columns, and aisle obstructions that might be struck, such as those located in or near passageways.

h. Frames of elevator doors and gates; lips of horizontally closing doors.

i. Outdoor traffic signs and dead ends.

j. Handrails and guardrails.

k. Unsafe drinking water supply.



(4) FIRE PROTECTION RED. --For fire equipment and specific dangers. Use on--

a. Extinguishers (or boards on which they are mounted), hose nozzles and connections, sirens, pumps, fire tool and ladder markings, buckets, pails, and water barrels.

b. Fire alarm stations and hydrants.

c. Fire doors and exit lights.

d. Safety cans and gasoline dispensing pumps.

e. Danger signs.

f. Water faucets or hydrants used for fire protection.



(5) PRECAUTION BLUE. --To caution against operating certain equipment. Use on--

a. Machinery and equipment that should not be moved or started.



8.11(5)b.

8.11 (5) b. Machinery and equipment being repaired.



(6) RADIOACTIVITY VIOLET. --
To identify all radioactive hazards,
such as radioisotopes and treated plots.

(7) CAR COLORS. --Body, safety green; top,
safety gray. (Selected for high visibility in both
summer and winter in forest and range settings.)

(8) TRAFFIC WHITE, GRAY, AND
BLACK. --Good housekeeping and indoor
traffic colors. Use on--

a. Marking for locations and
width of aisles, passageways, and dead
ends.

b. Marking for good house-
keeping facilities.

c. Floor areas immediately
surrounding waste receptacles.

d. Traffic controls.

e. Corners.

f. Walkways--gray or black.

g. Floor--gray.

h. Storage areas.

i. Waste receptacles.



(9) INTERIOR WALLS AND CEIL-
INGS. --Use light green, flat buff, gray,
cream, or white for high reflection
value.



(10) FIXED SHOP EQUIPMENT. --Use contrast-
ing colors, such as green on body, and buff, cream,
or ivory on moving parts. Use colors that reflect
rather than absorb light.

(11) PIPING SYSTEMS. --Use these colors--

a. Green, white, black, gray, or aluminum for safe materials such as water, brine, compressed air, hot water below 212° F., and cold water pipes.

b. Yellow for dangerous materials, such as acids, gases, and water hotter than 212° F.

c. Red for fire protection and sprinkler systems, hot water pipes.

8.12 COLOR STANDARDS (based on the following Pittsburgh paint specifications or their equals)--

(1) Safety Green (Vista Green UC-10076)

(2) Alert Orange (Focal Orange UC-10081)

(3) High Visibility Yellow (Focal Yellow UC-10078)

(4) Fire Protection Red (Focal Red UC-10080)

(5) Precaution Blue (Focal Blue UC-10077)

(6) For automobiles, FSS 595 Safety Green 14260, Gray 16307

8.13 FLUORESCENT AND LIGHT-REFLECTING PAINTS AND SIGNS

(1) These should be used where hazards justify it. Decalcomania or other transfer signs are also acceptable.

8.14 SAFETY SIGNS. --They SHALL conform to these standards (See Sign Handbook, Chapter IX, for layouts and suggested messages)--



8.14(1)

8.14 (1) DANGER.--To warn of specific dangers only, such as electrical or explosive hazards, and "No Smoking" areas. White background on face of sign. "Danger" in white letters set in red oval, set in black rectangular panel. Red and black to be separated by white line. Message in black letters on the white background.



(2) CAUTION.--To warn of possible dangers or unsafe practices. Yellow background on face of sign. "Caution" in yellow letters set in black panel. Message in black letters on the yellow background.



(3) SAFETY INSTRUCTION.--To provide information relating to general safe practices, such as good house-keeping. White background on face of sign. Heading in white letters set in green panel. Message in black letters on the white background.



(4) DIRECTION.--To indicate the way to stairways, fire escapes, exits, and other locations. Black letters on white background.



(5) INFORMATION.--To carry messages of a general nature, such as rules, regulations, and markers when such postings do not conflict with "Danger" or "Caution" signs. Message in black on white background.



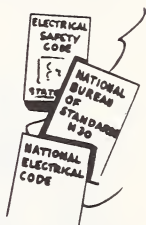


8.2 ELECTRICITY

8.21 GENERAL

(1) All wire and apparatus SHALL be of a type approved by the Underwriters' Laboratories, Inc.

(2) INSTALLATION AND MAINTENANCE SHALL COMPLY WITH THE ELECTRICAL SAFETY CODE, NATIONAL BUREAU OF STANDARDS HANDBOOK H30, NATIONAL ELECTRICAL CODE, OR STATE CODES, WHICHEVER IS APPROPRIATE.



8.22 INSTALLATION AND REPAIR

See also 8.14(1) Danger Signs.

(1) Wiring in buildings, and other than minor repairs to electrical equipment, SHALL be made only by a competent electrician, licensed in States requiring licenses.



(2) Power SHALL be shut off before work is done on "hot" lines. Exceptions: An authorized electrician, in an emergency may work on a live line not exceeding 220 volts, if he is supplied with adequate safety devices.



8.22(3)

8.22 (3) The lock on seal switches supplying current to lines upon which work is being done SHALL be locked in the "off" position to prevent accidental closing. A warning tag SHALL be attached.



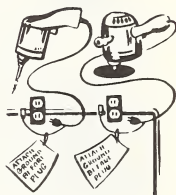
(4) Access to switch, fuse, and breaker boxes SHALL be kept clear.

(5) Changes or repairs to company-owned lines leading to the master service switch SHALL be made only by the power company.

(6) Loose wires hanging from buildings or poles SHALL not be touched until you are certain they are not connected to a live source of electricity.

(7) Insulation on wire SHALL not be completely trusted.

(8) Frames of motors including portable electric handtools that operate at less than 150 volts to ground SHALL be grounded, if this can be readily accomplished. However, many special circuit and equipment conditions require exceptions to these general rules. Consult appropriate electric code.



(9) Caution SHALL be particularly exercised in connection with fixed installations or portable power tools installed or used in hazardous locations, such as damp places, and with household appliances in kitchens, bathrooms, or basements where contact with water pipes may be made easily.

(10) The following unsafe conditions SHALL be remedied:

- a. Defective or broken insulation on a cord.
- b. IMPROPER OR POORLY MADE CONNECTIONS TO TERMINALS.
- c. Broken or otherwise defective plug.
- d. Loose or broken switch.

(11) The power company SHALL be notified in advance concerning work to be done near powerlines or high voltage installations.

(12) Switch SHALL be pulled before cartridge-type fuses are removed or replaced.

(13) Modern homes are usually wired with several lighting branch circuits employing #14 AWG wire requiring 15-ampere fuse and with a single kitchen and/or appliance circuit using #12 AWG wire requiring a 20-ampere fuse. Larger fuses than appropriate for the type of branch circuit SHALL not be substituted. When in doubt use the smaller rating 15-ampere fuse and ask an electrician if wiring will permit larger size.

(14) Circuits SHALL not be overloaded. Where excessive use of appliances results in frequent fuse failure, redistribute plug-in appliances or have additional circuits installed. Fuses SHALL not be changed to higher rating than wire size permits.

(15) Electric outlets and switches SHALL be so placed, especially in bathrooms, laundries, laboratories, and engine rooms, that--



8.22(15)a.

8.22(15) a. They cannot be reached by anyone standing on a wet surface.

b. One cannot touch a grounded conductor, such as a water pipe.

(16) Use of extension cords SHALL be subject to these restrictions--

a. Disconnect by pulling the plug, not the cord.

b. Replace when worn, frayed, or brittle.

c. Hang on nonflammable non-conductors or insulated staples.

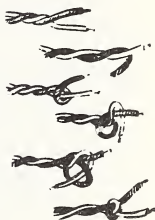
d. Tie the wires by Underwriter's knots when repairing plugs permitting this practice.

e. Store them in a clean, dry place where they can lie loosely coiled.

f. Do not overheat them or allow them to become kinked or come in contact with oil, grease, or chemicals.

g. They SHALL not be run over by motor vehicles or other wheeled objects.

h. They SHALL not be inserted through walls unless correctly insulated wire is used.



8.23 EQUIPMENT

(1) Electrician's handtools SHALL be in good repair and restricted to their proper use.

(2) Rubber gloves SHALL be inspected and given the air test before they are used. Gloves and similar equipment SHALL be inspected before use, and then at 30-day intervals during use.



(3) Only nonconducting ladders SHALL be used for electrical work.

(4) Only dry powder smothering-type or carbon dioxide extinguishers SHALL be used on fires involving electrical equipment. Current SHALL be turned off first if possible.

(5) Electric appliances SHALL never be touched with wet hands.

(6) Metal pull cords SHALL have link insulators or SHALL be extended with ribbon or twine.

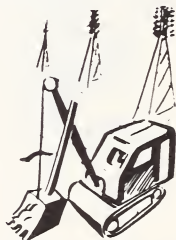
(7) Great care SHALL be used to avoid contact with 110-volt current, particularly when there is any chance that your body is grounded; 110-volt circuits are killers.



8.24 These general rules SHALL be used for working in the vicinity of powerlines:

(1) ALWAYS TREAT ALL POWERLINES AS DANGEROUS.

(2) Workers SHALL be especially careful to prevent wire rope, telephone lines, derrick booms, water from fire pumps, or other conductors from coming within 15 feet of high-voltage wires. Where there is less clearance or where there is any question about the electrical hazard, consult your work supervisor or power company authorities before starting work or making changes.



8.24(3)

8.24 (3) Power shovels, booms, and other machinery, telephone wire, pipe, drills, well casing, and other such materials SHALL be moved with extreme care when in the vicinity of powerlines. The clearance SHALL at least equal the length of the boom plus the material being handled, or the distance of its possibly uncontrolled movement.

(4) Surveying and measurements in the vicinity of powerlines SHALL be made--

- a. With clean, dry, wooden rules or nonmetallic cloth tapes.
- b. By the stadia method.
- c. By frequent "breaks" of tape, to avoid long spans across canyons.
- d. By offsetting away from dangerous areas.



(5) Telephone wire being stretched beneath a powerline SHALL be held securely from contact with the powerline by means of a clean, dry rope in sound condition, a short distance on each side of the crossing.



(6) When a telephone line is supported on the same poles with a powerline, everyone in contact with the ground, steel pole or tower, and ground wire or other ground potential SHALL remain clear of the wire while it is being stretched.

(7) Crews felling timber in the vicinity of a powerline SHALL use one or more heavy rope lines, securely anchored, to prevent the tree from falling

on the powerline. The rope SHALL be fastened high enough on the tree being felled to provide good leverage.

(8) Brush SHALL not be burned close to powerlines because flame is a conductor of electricity.

(9) A stream of water SHALL never be played on or near a line that may be electrically charged. Use water only after a responsible power company employee has tested the line and found it to be dead. In the meantime, any work necessary to control a fire SHALL be done with all men, hose, and equipment at a safe distance from all broken or sagging conductors.

(10) Automatic breaker action on one or both ends of a line does not make it safe. The breaker may be reclosed, or the line may be subject to induced voltage. Powerline conductors SHALL be handled only by company employees.

(11) The first contact with a telephone wire that passes in the vicinity of powerlines SHALL be made with the back of the hand, so that hand will not involuntarily close and grip a hot conductor.



8.24(12)

8.24(12) You SHALL never work with one hand on a wire which may become charged while the other hand or another part of the body is grounded. A faucet SHALL not be grasped with one hand while flipping a light switch with the other.



(13) The condition of all powerlines that may affect the national forest, our personnel, or the public SHALL be checked. All broken or leaky insulators, line breaks, broken poles, or dangerous trees or other conditions that appear to be unsafe SHALL be reported.

(14) See also 6.2 Radio and Telephone.

8.25 RESCUE

(1) Those engaged in any electrical work SHALL be able to give artificial respiration and first aid treatment for burns to victims of electrical shock.

(2) To rescue persons in contact with live wires--

- a. Assume that wire is alive and do not allow it to touch you.
- b. Do not touch victim with bare hands until wire is removed.
- c. Use a nonconductor such as dry pole or dry rope to pull wire from victim.
- d. Shut off current at nearest switch.



(3) See also First Aid Guide.



8.3 LABORATORIES AND CHEMICALS

8.31 GENERAL

(1) Breathing fumes, poor house-keeping, and personal uncleanness are the greatest sources of danger around chemicals. The best clothing and safety devices will not provide complete protection. Care in handling dangerous chemicals and effective use of first aid procedures are also essential.



(2) Manufacturers' instructions regarding safety SHALL be followed unless they have been altered in writing by the responsible supervising officer.

(3) Persons with suspected allergies should not be assigned to work with chemicals.

(4) Project workers handling containers of chemicals SHALL be under the supervision of a person prepared to render immediate first aid in case of spillage or breakage. They SHALL avoid breathing fumes, vapors, or dust that may result from such spillage or breakage.

8.32 LABORATORY WORK

(1) Safety equipment, first aid kits, and extinguishers SHALL be readily available for emergencies, and employees SHALL be trained in their use.



8.32(2)

8.32 (2) Chemicals in heavy containers should be stored on or near the floor, where they are protected from falling or colliding objects.

(3) Chemicals that react with dangerous effect SHALL be stored so that undesirable reaction SHALL not occur if the containers break.

(4) Extra caution SHALL be used when handling glassware. For example, large bottles should not be carried by their necks, and large beakers should not be picked up by their rims. Use toweling if there are dangers of breakage.

(5) See also 7.3 Safety Equipment, 3.3 Flammables, and First Aid Guide.

8.33 JOB PLANNING

(1) When it is decided to use a chemical on a project, complete information as to its formulation and poisonous, flammable, or corrosive characteristics SHALL be reviewed. Any special equipment or devices needed for applying the chemical or protecting the employees handling the chemical SHALL be specified in the project plan. Such equipment and devices SHALL be obtained prior to the use of the chemical.



**HANDLING
CHEMICALS**

(2) One person SHALL be designated to supervise the project use of chemicals, including their transportation, mixing, and storage.

a. He SHALL be designated only after he has acquired thorough safe handling techniques of the chemical to be used, including--

BLDGS. AND GROUNDS

LABS AND CHEMICALS

1. Poisonous, flammable, or corrosive characteristics of chemical.
2. Characteristics of base material, if chemical is diluted for application.
3. Transportation, mixing, and storage of chemical and base.
4. Use and care of equipment.
5. All precautions needed, such as fire protection, safe clothing, and protective devices.
6. Safe work methods.
7. Chemical first aid procedures.

8.34 STORAGE AND TRANSIT

(1) Chemicals SHALL be kept separated from other materials in a well-ventilated location, where there is no danger of food contamination, either in transit or in storage.

(2) Only sufficient amounts of highly poisonous, corrosive, or flammable chemicals SHALL be purchased to meet current needs and prevent prolonged storage periods wherever possible.

(3) All chemical containers SHALL be labeled as to contents, and whether they are poisonous, flammable, or corrosive. If in doubt about contents of an unlabeled container, they SHALL be disposed of as described in 8.36.



(4) Chemicals in glass bottles SHALL be kept out of the sun and away from heat.

(5) Before lifting glass containers, workers' hands and glass SHALL be dry.



8.34(6)

8.34 (6) Adequate warning signs SHALL be displayed prominently stating precautions necessary around stored chemicals.

(7) Storage place SHALL be cleaned thoroughly before using for other purposes.

(8) Dangerous, poisonous, flammable, or corrosive chemicals SHALL be kept locked up.

8.35 MIXING AND USING

(1) A suitable, well-ventilated site, with ample space or exits for workers to leave a contaminated atmosphere, SHALL be selected for mixing operations. An ample supply of water SHALL be readily available to dilute chemical burns and flush away spills. Where dangerous chemicals are regularly mixed or used, a shower head should be installed. Soap, towels, and first aid equipment SHALL be immediately available for removing or diluting chemicals spilled on workers or their clothing. Approved fire extinguishers SHALL be available, and smoking and open flames SHALL be prohibited when flammable chemicals are used. All electrical switches and motors in the area SHALL be turned off or grounded to prevent sparking or arcing.

(2) Workers mixing or using acid, poisonous, or corrosive substances SHALL wear, where appropriate, approved protective accessories such as gloves, goggles, face masks, aprons, and long-sleeved, high-necked clothing that will expose as little of the skin as possible.

a. If skin contact cannot be avoided, workers SHALL use protective lotions.



BLDGS. AND GROUNDS

LABS AND CHEMICALS

b. Accumulation of chemicals on clothing SHALL be avoided.

(3) Workers SHALL avoid breathing chemicals, sprays, gases, vapors, fumes, or dust as much as possible, and SHALL wear approved respirators or masks when suggested by the manufacturers.

(4) Chemicals SHALL be dusted or sprayed to windward as much as possible.

(5) Dangerous substances like allyl alcohol, alkalis, or acids SHALL be removed from their containers by pump, ejector, or siphon. The mouth SHALL never be used to prime siphon tube. To dilute chemicals, always pour into the diluting material, never the reverse.

(6) Workers who complain of headache, nausea, giddiness, or body pains while using or after using chemicals SHALL be taken to a doctor immediately.

(7) Precautions SHALL be taken to prevent animals from eating toxic chemicals on treated vegetation, such as by adding animal repellants.

8.36 DISPOSAL OF UNUSED CHEMICALS AND CONTAINERS

(1) Small quantities of chemicals remaining at end of project SHALL be disposed of in one of the following ways:

a. Flammable liquids SHALL be destroyed by burning. They SHALL never be poured into drains or sewers. Exception: If miscible with water, dissolve in at least 20 parts of water and flush down drain.



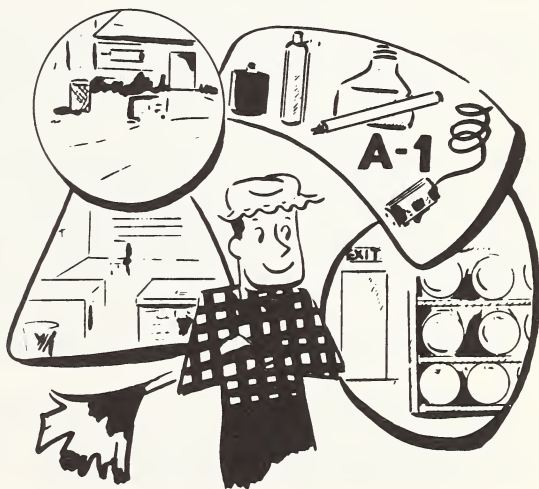
8.36(1)b.

8.36 (1) b. Acids or alkalies can be destroyed by diluting them with water and flushing down the sink. When diluting an acid or alkali, it SHALL always be poured slowly into water, never the reverse.

c. Dangerous chemicals such as those capable of making poisonous gas SHALL not be emptied into drains, but SHALL be destroyed by some one familiar with handling chemicals.

(2) Chemicals in storage for periods exceeding the maximum period recommended by the manufacturer SHALL be disposed of as described in 8.36(1).

(3) Containers, liners, and debris of toxic, flammable, or corrosive chemicals SHALL be buried in an appropriate place and at a depth that will prevent them from being exposed by rooting or digging animals, such as hogs or dogs.



8.37 CHEMICALS USED IN OUR WORK

(1) Allyl Alcohol is extremely dangerous, explosive, flammable, poisonous, and corrosive. Fumes are blinding.

a. It SHALL be kept tightly sealed, away from heat, flame, gas, or oil, 50 feet from buildings or in a separate shed.

b. Equipment SHALL be grounded for static.

c. Equipment SHALL be thoroughly flushed after use.

d. Any spills on skin or clothing SHALL be removed immediately with soap and water to avoid serious burns.

(2) Ammate (Ammonium Sulfamate) is not poisonous or flammable, but excess contact SHALL be avoided. Exposed skin SHALL be washed frequently and at end of shift. Clothing SHALL be cleaned at least once a week.

(3) Arsenic Oxide is poisonous and corrosive. Workers SHALL avoid breathing the dust. Wash dust from skin.

(4) Atlacide is flammable. Treat like Sodium Chlorate.

a. Benzine Hexachloride (5--10% dust) is a skin irritant and stomach poison. Worker SHALL wear goggles, respirator, and gloves.

(5) Calcium Chlorate is highly flammable and explosive when in contact with organic or other combustible materials. Clothing SHALL be changed if chemical gets on it.



8.37(6)

8.37 (6) Carbon Tetrachloride is extremely poisonous and may be fatal to persons who breathe vapors for long periods.

- a. Adequate ventilation SHALL be provided.
- b. Keep it off the skin.

(7) Chlordane Dust is more poisonous than DDT. Avoid breathing it.

(8) Chlorinated Lime will burn eyes and skin.

- a. Precaution SHALL be taken to keep it out of eyes, nose, and mouth.
- b. It SHALL not be stored in airtight containers.

c. Cans of Chlorinated Lime SHALL be punctured before storing to prevent accumulation of internal pressure that can scatter the lime when can is opened.

(9) Chloropicrin or tear gas users SHALL wear gas masks at all times.

(10) Copper Sulfate is mildly poisonous. Workers SHALL wash carefully and keep clothes clean.

(11) Crosote. --See 5.7 Wood Preserving.

(12) Cyanides are extremely poisonous.

a. When fumigating, warning signs and barriers SHALL be placed at all building entrances.

b. Workers SHALL work in pairs and each be provided with and wear a mask designed to protect him against cyanide.

c. When fumigation is complete, doors and windows SHALL be opened by persons wearing respirators. Adults SHALL enter only after 12 hours of airing; children only after 18 hours.

BLDGS. AND GROUNDS

LABS AND CHEMICALS

(13) DDT is less poisonous than Sodium Fluoride, but it is flammable.

- a. All food supplies SHALL be covered when spraying is being done.
- b. Avoid breathing fumes from DDT.
- c. After using DDT wash with soap and warm water.
- d. Washing facilities should be provided so solution spilled on skin will not be absorbed.

(14) Dinitro Amyl Phenol is a poisonous chemical and SHALL be treated accordingly.

(15) Ethylene Dibromide is poisonous and will blister the skin. Treat like allyl alcohol.

(16) Methyl Bromide is more poisonous than ethylene dibromide. Treat like allyl alcohol.

- a. Cans SHALL be tightly packed for transportation.
- b. Cans SHALL be stored in a cool, dry place, in tight metal cabinet, never with gas or oil.
- c. Cans SHALL be opened outside and destroyed immediately after use.
- d. In storage, cans SHALL be watched closely for signs of corrosion releasing the gas.
- e. Applicators and gasproof covers SHALL be thoroughly cleaned before they are stored.

(17) Mineral Spirits are flammable.

- a. Equipment and drums SHALL be grounded for static.
- b. There SHALL be no smoking.

(18) Orthodichlorobenzene is flammable in oil solution.



8.37(18)a.

8.37(18) a. If fluid enters eyes, wash eyes immediately with large amounts of water and treat with lanolin. Goggles should be worn.

b. Skin and clothing SHALL be washed frequently.

(19) Parathion is flammable and highly poisonous.

a. Respirator SHALL be worn.

b. Avoid getting it on skin or breathing it.

c. Wash from skin with soap and warm water.

d. Clothing should be changed daily.

(20) Pentachlorophenol is flammable and poisonous. It causes dermatitis. It is sometimes used with flammable solvents.

a. Avoid breathing it and getting it on skin.

b. Wash from skin immediately.

(21) Polybor Chlorate can be ignited by friction. It is explosive and flammable when in contact with organic matter or other combustible material.

(22) Sodium Arsenite is poisonous and causes burns and skin irritations. It SHALL be mixed outside. Safe handling methods SHALL be used.

(23) Sodium Chlorate can be ignited by friction. It is explosive and flammable when in contact with organic matter or other combustible material.

a. It SHALL be mixed on the job, never transported in solution.

b. Workers SHALL change clothes on the job and wash work clothes at least once a week.

c. Containers, liners, and debris SHALL be burned immediately.



BLDGS. AND GROUNDS

LABS AND CHEMICALS

d. Fire extinguisher SHALL be readily available.

(24) Sodium Chromate is poisonous. Avoid breathing it. Wash from skin immediately.

(25) Sodium Fluoride SHALL be treated like sodium chromate.

(26) Sodium Fluoracetate (1080) is a deadly poison, worse than thallium sulfate.

a. Workers SHALL be specially trained before using it.

b. Extreme care SHALL be taken in storing and using it.

c. Use metal spoon for mixing.

(27) Sodium Pentachlorophenate (Crystalline) is poisonous. Workers SHALL cover eyes and face with mask, or wear tight goggles and respirator.

(28) Sodium Trichloroacetate is poisonous.

a. Workers SHALL avoid breathing it and getting it on skin or in eyes. If it enters eyes, flush with large quantities of water.

b. Workers SHALL change clothes daily.

(29) Strichnine and Strichnine Alkaloid are very poisonous.

(30) Sulfur Dioxide is poisonous and irritating.

(31) Sulfuric Acid is corrosive and dangerous to handle. To dilute, always pour acid slowly into water.

(32) Thallium Sulfate is a deadly poison.



8.37(33)

8.37(33) 2,4-D is mildly poisonous and is flammable in an oil base.

(34) 2,4,5-T is mildly poisonous and flammable in an oil base.

(35) Warfarin (Warf 42) is toxic.

(36) White Arsenic is very poisonous and a powerful skin irritant.

a. Wash from skin immediately.

b. Change clothes daily.

c. Wear protective clothing, coveralls, goggles, and mask.

(37) Zinc Chloride is a poison.



8.4 OFFICES AND DWELLINGS

8.41 MANDATORY OFFICE REQUIREMENTS

(1) Space SHALL conform with all local, State, and Federal regulations regarding building codes, lighting, fire protection, sanitation, and health.

(2) Sufficient lighting SHALL be provided so that all employees can see and avoid the normal hazards in storerooms, halls, and offices.

(3) Fire-protection system SHALL be checked annually. It SHALL be fully understood by all employees.

(4) Aisles, halls, and stairways SHALL be clear of objects that might cause employees to fall.

(5) Elevators SHALL be operated within safe carrying capacities.

(6) File cabinets SHALL be fastened when practicable.

(7) Bottom drawers in file cabinets SHALL carry heaviest loads wherever possible.



8.41(8)

8.41 (8) Desk and file drawers, cabinet doors, and bookcase sliding doors SHALL be closed when not in use.

(9) Extension cords for electrical equipment and telephones SHALL be placed where they are not tripping hazards.

(10) Wornout insulation and exposed wire SHALL be repaired.

(11) Electric fans, papercutters, and other hazardous equipment SHALL be placed where they are no hazard.

(12) All hazardous belts, gears, pulleys, rotating parts on office machines SHALL be guarded.

(13) Window sills and ledges SHALL be free of loose objects.

(14) Matches, cigars, cigarettes, and pipe heels SHALL be dead out when disposed of. Wastebaskets should not be used as ashtrays.

(15) Broken glass SHALL be wrapped, marked, and put aside (not in wastebasket) for the janitor.

(16) See also 3.2 Building Fire Protection and 8.6 Warehousing.



8.42 RECOMMENDED OFFICE PRACTICES

(1) Floors should be treated with nonskid wax.

(2) Small rugs should be provided with nonskid backing.

BLDGS. AND GROUNDS

OFFICES - DWELLINGS

(3) Glass desk tops should not have breaks or sharp edges.

(4) Safe lifting practices. See 8.62.

(5) Ladders should be used to reach top shelves instead of makeshifts like chairs and boxes.



(6) Regular paper fasteners should be used; never pins. Razor blades and pins should be kept in containers, never loose in desks or thrown in waste baskets.

(7) First aid kit should be available for treatment of all scratches and cuts to prevent infection. See First Aid Guide.



(8) Furniture should be frequently examined for splinters and weakened or broken parts. Furniture needing repairs should be placed in nonuse status.

8.43 HOT WATER SAFETY

(1) Hot water tanks SHALL be equipped with a safety relief valve if a check valve prevents the hot water from backing into the cold water main or if there is no expansion tank.

(2) The pressure at which a safety relief valve is set to operate SHALL not be in excess of the maximum allowable working pressure of the tank.



8.43(3)

8.43 (3) There SHALL be no valve or other obstruction between the safety relief valve and the tank; the discharge opening SHALL be the full size of valve opening; and the safety valve SHALL be so arranged that no one may be scalded by its discharge.

8.44 GAS, OIL, AND KEROSENE SPACE HEATERS

(1) All gas or fuel oil space heaters installed in sleeping quarters SHALL be vented. In other structures, heaters SHALL have vent pipes connected with an approved flue or piped directly to the outside of the building, unless they are approved by the National Board of Fire Underwriters for unvented use.

(2) Rooms, including lookout cabs, heated with kerosene-wick-type space heaters SHALL be ventilated to avoid illness or death from improper combustion of noxious gases.

(3) Gas-burning equipment SHALL bear the approval seal of the American Gas Association Laboratories. Equipment SHALL have an automatic shut-off which will cut off all gas supply to the appliance including the pilot, in case the pilot flame goes out.



Vents should be used for all gas-burning appliances. They SHALL be used for thermostatically controlled domestic appliances with an input rating of over 5,000 BTU per hour.

Storage containers and piping SHALL conform to the requirements of National Board of Fire Underwriters Pamphlet No. 58, The Standards for the Storage and Handling of Liquified Petroleum Gases.



BLDGS. AND GROUNDS

OFFICES - DWELLINGS



8.5 REPAIR SHOPS

8.51 GENERAL

(1) Machines SHALL not be cleaned, lubricated, adjusted, or repaired while in motion, if the same adjustment can be made with all motion stopped.

(2) Machinery SHALL be repaired only when there is sufficient light to see clearly.

(3) An "Out-of-Order" warning sign, showing when, why, and by whom, SHALL be posted until repairs are completed. When special dangers are involved, the switch SHALL be locked in the off position; for battery-operated equipment, the ungrounded cable SHALL be removed from the battery post.



(4) Equipment that is supported by slings, hoist, or jacks for repairs SHALL be blocked or cribbed before men are permitted underneath for any purpose.

(5) When repairs are made on conveyors, cableways, etc., far from the source of power, removal of fuses, disconnecting battery chains, blocking, or other such devices SHALL be used to prevent starting.

(6) Blocking material should have wide parallel flat surfaces. Stage blocking SHALL be as nearly perpendicular as possible.



8. 51(7)

8. 51 (7) Metal pedestal supports SHALL have sufficient base and top area to safely support loads without danger of tipping over.

(8) When repairs or other work are completed, a check SHALL be made to see that everyone is in the clear before equipment is started.

(9) Repairman should have at least one man assisting him when he is working on heavy equipment in the field.

(10) Workers SHALL stay a safe distance from moving machines so that clothing and handtools, SHALL not be caught.

(11) Cranks for all gas engines SHALL be so mounted that they cannot fly out and strike operator.

(12) When cranking any gasoline engine, operator SHALL--

- a. Retard spark, if adjustable.
- b. Get safe footing.
- c. Be sure fingers are clear when cranking.
- d. Use safety grip, thumb not around handle.
- e. Pull top quadrant.
- f. Never spin crank.



(13) See also Chapter 7 Equipment and 3. 3 Flammables.

8. 52 CAR SERVICING AND REPAIRS

(1) Cars SHALL be maintained in accordance with State motor vehicle laws and Forest Service equipment safety and maintenance standards.

BLDGS. AND GROUNDS

REPAIR SHOPS

(2) All electric power-operated equipment, including portable electric handtools, SHALL be maintained in good repair, with particular attention to electrical grounds, connections, and insulation. See 8.2 Electricity.

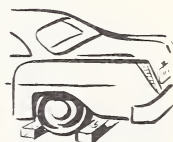
(3) Operator SHALL be cautious when using electrical equipment under wet conditions, such as when washing cars or when vehicles are on wet floor or ground.

(4) Hydraulic lift SHALL have safety lock or other device to prevent accidental lowering.



(5) A grease pit below floor level SHALL not be used unless it is mechanically ventilated and provided with an exit. Plank ramps or power hoists and blocking are preferred.

(6) If pits are used, they SHALL be free of oil, grease, rags, and fumes, and SHALL be provided with guardrails or a cover, whether inside or outdoors.



(7) If car is not jacked up, brake SHALL be applied and the wheel blocked to prevent car from rolling.

(8) Lock ring SHALL be in correct position when tire on vehicle is inflated.

(9) When inflating tire which is removed from vehicle, lock ring side SHALL be either down or against wall.



8.52(10)

8.52(10) All tire repair servicing stations should have safety chain or tire rack device to prevent possibility of injuries from flying rims.

(11) Foot brake and clutch pedals on all automotive equipment should be covered with rubber nonskid foot pads to minimize possibilities of driver's feet slipping off pedals.

(12) Windshield wipers should be positive power operated.

(13) BEFORE ANY WORK IS DONE OR ADJUSTMENT MADE ON THE CHASSIS OF A DUMP TRUCK WHILE THE BODY IS IN AN ELEVATED POSITION, THE BODY SHALL BE SECURED BY AN ATTACHED PROP STRONG ENOUGH TO PREVENT ITS ACCIDENTAL LOWERING. A SIGN CALLING ATTENTION TO THIS REQUIREMENT SHALL BE PLACED AT EYE LEVEL NEAR BOTH REAR CORNERS OF THE CAB. THIS SAME PRECAUTION IS REQUIRED WHEN OPERATING A LOAD LUGGER.



8.53 USE OF SOLVENTS

(1) Gasoline SHALL not be used for cleaning.

(2) Cleaning solvents SHALL have a flash point of 100° F. or higher.

8.54 BATTERY SERVICING--Caution: Recharging batteries generate explosive gases.

(1) Battery charger setup SHALL be in a well-ventilated area to avoid explosion of hydrogen released by battery.

(2) No exposed flame, spark, smokers' materials, welding, or gases SHALL be brought near a battery being charged or shortly thereafter.

(3) Battery charger SHALL be shut off before batteries are connected, disconnected, or tested. A sign stating this SHALL be placed at battery charger.

(4) Battery acid SHALL be kept away from skin and clothing.

(5) In preparing electrolyte solutions, acid SHALL be poured slowly into the water. Water SHALL never be poured into the acid.

8.55 COMPRESSORS

(1) All tanks, excepting garage type, using over 80 pounds pressure SHALL be tested and stamped in compliance with the ASME Code, and SHALL show that they conform with State laws. Any tanks not so stamped SHALL be given a hydrostatic test to 25 per cent over maximum operating pressure. Date of test SHALL be permanently marked on tank.

(2) A thorough monthly inspection SHALL be made for leaks. Any worn parts that might cause an accident SHALL be replaced.

(3) The brass fusible plug SHALL not be replaced with an ordinary pipe plug.

(4) Airfilter screens SHALL be cleaned in crankcase oil, not in solvents, kerosene, or gasoline.



8.55(5)

8.55 (5) Compressor valves SHALL be removed for cleaning. Carbon may be loosened by soaking valves overnight in solvent, but they SHALL be absolutely dry before reinstalling them. Valves SHALL not be interchanged. When valves are removed, pistons or heads SHALL not be cleaned with solvent or kerosene at any time.

(6) All pressure tanks or lines SHALL be provided with safety valves, with air-pressure gages, and with a drain cock at the lowest point on the tank. If one of them is defective, it SHALL be replaced, not repaired.

(7) Safety valves SHALL be checked to make sure they unload at the rated safe capacity by holding unloader arm to build up pressure to safety valve setting.



(8) Unloader mechanisms are set to maintain a pressure of 85 to 90 pounds. If they stick or get out of order, repairs SHALL be made by a competent mechanic.

(9) Garage compressors SHALL be drained once a week during heavy use, once a month during light use. They SHALL be tagged accordingly.

8.56 STEAM HOSE

(1) Operator SHALL --

- a. Wear rubber boots and apron reaching below boot tops.
- b. Grasp hose firmly close to nozzle, to prevent whipping.
- c. Point nozzle to floor before opening valve.
- d. Turn on water first, then turn on steam.



BLDGS. AND GROUNDS

REPAIR SHOPS

e. Turn off steam first, then turn off water.

8.57 MONOXIDE GAS--This gas is odorless, colorless, and tasteless. It is a deadly poison, killing quickly without warning.

(1) Employees SHALL guard against it at all times.

a. Operate gasoline motors in closed building when ample ventilation is provided or when exhaust fumes are forced outside.

b. Provide interior ventilation by partly opened windows when driving vehicles.

c. Exhaust pipes and manifolds SHALL be located so fumes will not endanger the operator or other workers.

d. Connections to exhaust pipes and manifolds SHALL be tight enough to prevent fume leaks.

(2) Sufficient tail pipe SHALL be installed to keep exhaust fumes from swirling up into the truck.







8.6 WAREHOUSING

8.61 GENERAL

(1) Neatness and orderliness SHALL be maintained at all times.

(2) Gloves or hand leathers and pads, leather or canvas aprons, and safety shoes SHALL be used when handling heavy or sharp-edged objects.



(3) When unpacking material, boards with nails SHALL be pulled or cinched. Nails SHALL be removed from opened boxes and kegs used for storage or material carrying.

(4) Piling instructions:

a. Safe floor load limits SHALL be observed. Heaviest items should be stored near walls, where floor joists have the greatest strength.

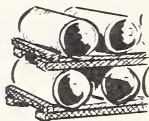
b. Each pile SHALL have a firm foundation.

c. Round objects SHALL be blocked or bracketed so that they cannot roll.

d. Tiers SHALL be cross-piled or tied so that materials support each other if possible.

e. Insecure tiers SHALL be interlocked with boards or other materials.

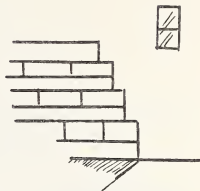
f. Material SHALL be piled only high enough for safe lifting, handling, and storage.



8.61(4)g.

8.61 (4) g. Material SHALL be leaned away from aisles to prevent toppling.

h. Piles SHALL be broken down from the top, with step backs or taper maintained, and with no undercutting.



(5) Tools or materials SHALL be stored away from--

a. Unguarded windows where they might fall out.

b. Heat sources, if flammable.

c. Aisles, fire escapes, fire equipment, and electric switches.

(6) Grease oil or paint rags, excelsior, paper, or other flammable material SHALL be placed only in metal receptacles, which should be emptied frequently. Wet excelsior and similar fibrous packing is conducive to spontaneous combustion and should be removed from the warehouse immediately.



(7) When hoist is used, load SHALL be secure; and workers SHALL be out from under load before it is lifted.

(8) Employees SHALL watch for pinch points, splinters, slivers, and projecting nails.

(9) See also 7.3 Safety Equipment, 7.1 Hand-tools, and 6.5 Ladders.

8.62 LIFTING

(1) Mechanical devices such as skids, rollers, hand and lift trucks, hoists, wheelbarrows, tongs, cant hooks, peavies, haypoles, hand spikes SHALL be used to avoid injury.

BLDGS. AND GROUNDS

WAREHOUSING

(2) Employee's immediate supervisor SHALL--

- a. Be sure of worker's physical fitness to lift.
- b. Give worker detailed instructions on how to lift.
- c. Check frequently on lifting practices.



(3) Employee SHALL--

- a. Get a firm grip.
- b. Keep the body upright. He SHALL lift with the leg and arm muscles, not with the back and stomach.

- c. Get a good footing. Crouch when starting to lift.

- d. Take a deep breath and hold breath while lifting or lowering the load.

- e. Test the load first. Lift gradually; avoid jerky motions. Keep the load close to the body.

- f. Avoid twisting motions. Employee SHALL not shift positions of the feet while lifting, until he has raised the load.

- g. ASK FOR HELP IF THE LOAD IS HEAVY. EMPLOYEE SHALL NOT TRY TO LIFT BEYOND HIS STRENGTH.

- h. Check with supervisor to make sure the best methods of lifting are used, if in doubt how to handle material.

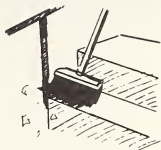
- i. Avoid a foolish show off demonstration of strength.

(4) The lifting limit should be 70 pounds for men, 25 pounds for women.



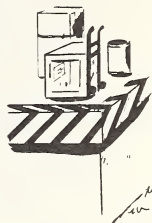
8.63 STAIRWAYS AND FLOORS

(1) All stairways, aisles, floors, working spaces, platforms, and exits SHALL be kept free from defects, rubbish, slippery substances, loose material, or obstructions that might cause falls.



(2) Handrails SHALL be used on hazardous stairways and platforms.

(3) All floor or wall openings where floor on other side is not at same elevation SHALL be guarded by railings, or barriers, or marked by paint if unsafe.



(4) Windows or other openings into elevator and hoist shafts, drying towers, etc. should be posted on the outside of the building to warn firemen forcing entrance into building.

(5) All passageways and stairs where slipping might occur should be painted with nonskid paint.

8.64 MATERIAL HANDLING

(1) Bagged material:

- a. It SHALL be crosstied when piling.
- b. Bag mouths should be placed toward center of pile.
- c. Pyramid method SHALL be used when piles are higher than 5 feet.



(2) Barrels, kegs, and drums:

- a. If piled on ends, they should have planks between layers. Planking should be as wide as the bearing surface of the container.

b. If piled on side, first row SHALL be blocked to prevent rolling.

(3) Boxes and crates should be stacked on the side having greatest area, unless contents, such as crated glass, require special handling.



(4) Cartons loaded:

a. They should be piled with care, because sides are not rigid and will not support a heavy load.

b. They should be protected from moisture to prevent collapse.

(5) Cement should not be stacked more than 10 sacks high, to avoid heavy lifting and to prevent piles from tipping over. If practical, alternate sack layers should be cross piled.

(6) Culverts, pipes, poles:

a. Crew SHALL lift, move, and lower object only upon prearranged signal of one member of the group.

b. Object SHALL be moved slowly, without sudden stops and starts.

c. Carrying bars or tongs should be used if possible.



(7) Glass:

a. This SHALL be carried on outside of arm, with palm of hand facing outward and the other hand reaching across the body and grasping the glass on top.

b. Sleeves SHALL be buttoned around the wrists.



8.64(7)c.

8.64 (7) c. Arteries and wrists SHALL be protected by leather cuffs, when considerable amount of glass work is to be done.

d. Large panes SHALL be handled singly.

e. Glass SHALL be stored on edge, in places where workers cannot run against it.



(8) Grass, hay, straw, and baled excelsior should be stored in a separate building. Only what is needed should be taken into the packing room.

(9) Lumber: Leather-faced gloves and aprons should be worn by workers loading and unloading lumber and handling rough lumber.

8.65 GOOD HOUSEKEEPING--First Step in a Safety Campaign

This results in--

(1) Nothing to trip or slip over in office or field.

(2) No trash in or around buildings or work areas.

(3) Fire hazards controlled. Flammables in safe containers. Electrical wires and equipment in A-1 shape.

(4) Safe storage. A place for everything. Is everything in its place?



8.7 WOOD AND METAL SHOPS

8.71 GENERAL

(1) There SHALL be clear, adequate aisle and working space around machines, maintained in a nonslippery condition.

(2) All cutting tools SHALL be in safe condition. Defective tools SHALL not be used.

(3) A guard over treadle SHALL be provided on treadle-operated machines to prevent accidental starting.

(4) Before starting any power-driven machine, the operator SHALL check to see that--

- a. The working surface is clear.
- b. Guards and safety devices are adjusted in place.
- c. All parts such as cutting tools, tool holders, chucks, centers, guides, and clamps are firmly adjusted for the work to be done and are set to clear all moving parts.

d. The machine is in safe operating condition, with all parts operating freely.

(5) Operators and all others SHALL stand out of line of feed of piece being machined or sawed. An operating machine SHALL never be left unattended.



8.71(6)

8.71 (6) Machines SHALL be stopped to oil, clean, or adjust them, and to change plates or cutters. Chuck wrenches and drift pins SHALL be removed as soon as work is adjusted.



(7) Sticks or brushes SHALL be used to remove particles, metal cuttings, chips, or dust from machines; never use the hands.



(8) Machinery SHALL be shut off immediately after completion of a work operation and before adjustments are made. The operator SHALL remain at the machine until it stops.

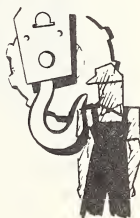
(9) Belts on operating machines should be replaced or shifted by means other than the hands. Machine should be operating at lowest possible speed.

(10) Belt dressing should be applied to the belt as it leaves the pulley.



(11) A chip guard SHALL be used when operating the chipper or lathe, if the material requires it.

(12) Support of overhead cranes SHALL be checked to be sure they can withstand heavy strains.



(13) See also 7.3 Safety Equipment.

8.72 WOODWORKING SHOP

A. SHAPERS

(1) Shaper heads SHALL be protected by encircling guards above the knives, extending beyond sweep of longest knife, and adjustable to height of work.

(2) Knives SHALL be kept sharp.

(3) Before starting the shaper, the operator SHALL assure himself that the cutter-head assembly is securely tightened and locked to the spindle.

(4) Small pieces SHALL be held in jigs.

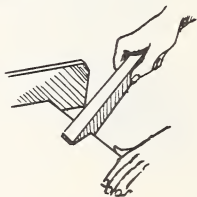
(5) In no case SHALL a warning device of leather or other material be attached to the spindle.

B. JOINTERS

(1) Jointer SHALL be equipped with a guard consisting of a metal cover wider than table opening and covering all of the cutter head in front of the guide. A guard covering the cutter head back of, and traveling with, the guide SHALL also be employed.

(2) A jig or pusher stick SHALL be used when jointing short pieces.

(3) Material being jointed SHALL be held so that hand is not in front of the work at start of cut, or at back of the work at finish of cut.



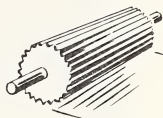
8.72C.

8.72 C. PLANERS, MOLDERS, STICKERS, TEN-ONERS, MATCHERS, AND PANEL RAISERS

(1) Powered feed rolls SHALL be guarded to keep operator's hand from being caught between rolls and running stock.

(2) Corrugations of feed rolls SHALL be kept clean and sharp.

(3) Anti-kickback dogs SHALL be used in front of feed roll.



(4) An exhaust system should be used to take up chips.

(5) Outrunning end SHALL be kept clear and workers SHALL stay out of line of finished pieces.

D. CIRCULAR TABLE SAWS

(1) Table-type saw guards SHALL include--

a. A hood covering saw at least to depth of teeth and giving a clear view of line of cut.

b. A spreader that is part of the guard.

c. An anti-kickback device, also a part of the guard.

d. Safe under-table protection.



(2) Guard SHALL be used except when it clearly interferes with some types of work and is therefore unsafe.

(3) Saw SHALL be used only for the type of work for which it is intended.

(4) Saw SHALL be installed and used only for designed speed.

(5) Saw SHALL be kept set and sharp, and arbor nut SHALL be tight.

(6) A pusher stick SHALL be used when narrow stock is sawed.

(7) The ripping fence SHALL not be used as a guide when crosscutting material.

(8) Cut control safety saws should be used if adaptable to the work to be done.

E. SWING CUTOFF SAWS

(1) The saw SHALL be kept set and sharp and the arbor nut SHALL be tight.

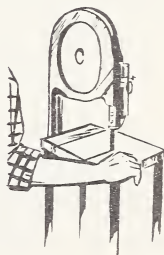
(2) The material to be sawed SHALL be free of loose knots, nails, etc.

F. BAND SAWS

(1) The upper wheel SHALL be turned manually before starting, to assure that the saw band will travel smoothly on both upper and lower wheels and through the band guide.

(2) All of the saw SHALL be enclosed except portion used in making the cut.

(3) If equipped with powered feed rolls, rolls SHALL be guarded.



8.72F.(4)

8.72 F. (4) The width of the saw band SHALL be as wide as the nature of the work will permit, but a wide saw band SHALL not be forced to cut on a small radius.

(5) All material being worked SHALL be kept in firm, full contact with the bed at all times. If material is of such size as to cause rocking on the bed because of overhand, supplemental supports SHALL be furnished.

G. DRILLS AND BORERS

.(1) Before starting the motor, the operator SHALL--

a. Be sure the drill is properly inserted and locked in the chuck.

b. Allow enough clearance to get the work between bit and table, and enough spindle travel to go through the work to the desired depth.

c. Material SHALL be clamped firmly to the bed, if difficult to hold it in proper position or alignment during drilling operations.

d. A wooden drill block not less than 1 inch in thickness SHALL be used between the bed and the material being drilled.



(2) Chucks for drills and boring bars SHALL have countersunk set screws so that there are no projections.

(3) Where counterweights are used, they SHALL be bolted to the bar.

H. SANDERS

(1) Powered feed roll SHALL be guarded between roll and stock.

(2) An exhaust hood connected to an adequate exhaust system should be provided to remove dust.

(3) Manually fed sanders should be provided with work rests to give support for the work.

(4) Pieces too small to allow hands to be kept a safe distance from the work SHALL be clamped securely.

I. WOOD LATHES

(1) Tool rest SHALL be set slightly below center, close to the face; too heavy cuts SHALL be avoided.

(2) A screen strong enough to hold a thrown head SHALL be furnished.

8.73 MACHINE SHOPS

A. GRINDING WHEELS

(1) Grinding machines SHALL be securely mounted on substantial foundations.

(2) New wheels SHALL be properly mounted, as a precaution against breaking.

a. Clean the bearing surfaces of wheel, flanges, and spindle.



8.73A.(2)b.

8.73 A. (2)b. Make sure wheel fits spindle, neither too tightly nor too loosely.

c. Use washers of soft material between flanges and wheels.

d. Tighten spindle nuts just enough to hold flanges firmly in place against wheel.

e. Before turning on power, turn wheel over a few times by hand to be sure that it runs true and does not strike guard or work rest.

(3) Wheels SHALL be equipped with tool rests, safe hoods, and belt guards. Hoods SHALL extend beyond outside edge of the stone.

(4) The tool rest SHALL be adjusted as close to the wheel as possible without touching it, so that the object being ground cannot be drawn between the guard and the wheel. The rest SHALL be fastened at the center line of the wheel; never below.

NOTICE
DO NOT GRIND
WITHOUT GOGGLES



(5) Before turning on power, guards SHALL be in adjustment.

(6) Goggles or eyeshield SHALL be worn at all times by worker using power grinder, unless grinder is equipped with safety glass shield.

(7) Signs stating that eye protection is required should be placed above all grinding machines.

(8) Operator SHALL stand to one side of the plane of a rotating grinding wheel during the first few seconds of wheel's operation.

(9) The work SHALL be applied gradually to a cold wheel, to warm up the wheel and reduce break-age.

(10) Operator SHALL grind on the sides of a wheel only when it is made for side grinding, and then only when the sides are not badly worn or when not much pressure is needed. Avoid striking the wheel on the side.

(11) A wet-type grinding wheel SHALL not stand partly in water when not in operation.

(12) Operator SHALL report immediately any grinding wheel that seems to be unsafe, or is operating improperly, such as vibrating excessively.

(13) Before leaving the wheel, the operator SHALL shut off the power. The operator SHALL remain at the machine until it has stopped.

B. BUFFING WHEELS

(1) A guard enclosing one-half of the sides and perimeter, extending from 30° above horizontal of the working face, SHALL be installed on stationary buffing wheels.

(2) Goggles, or a face shield, SHALL be worn by workers using a stationary buffing wheel, unless it is equipped with a safety glass shield.

(3) Operator using a portable buffer SHALL wear a face shield and stand to one side of the wheel.



C. METAL LATHES, PLANERS, SHAPERS,
MILLING MACHINES, ETC.

(1) The operator SHALL select a tool bit that is suited to the job and is in good condition, and SHALL set it securely in the tool holder.

(2) Operator SHALL apply a wrench to work or parts only when they are not revolving. The wrench SHALL be removed before operation is started.

(3) Hand power only SHALL be used when putting chucks or face plates on lathes, tightening arbor nuts on milling machines, etc., or for removing them.

(4) Machine SHALL be stopped to adjust length of stroke on planer or shaper, to adjust tools, and to change or adjust the work, if the machine is not constructed for safe adjustment when operating.

(5) Hoist SHALL be used for lifting heavy chucks and swinging work in place.

(6) Clutch or motor switch SHALL be placed within easy reach of the operator from his operating position.

(7) Tail stock, tool holder, and object being turned SHALL be tightly clamped before the power is turned on.

(8) Goggles or plastic shield SHALL be worn when starting or observing a cut and while working cast-iron pieces.

(9) Operator SHALL file left-handed when filing close to chucks or dogs.



8. 73C. (10)

8. 73 C. (10) Operator SHALL stop machine to change a cutting tool or to examine the cutting edge.

D. HYDRAULIC PRESSES. -- Flat or squared stock SHALL be provided for pressing and supporting parts worked on.

E. DRILL PRESSES

(1) Clamps, or a vise attached to the face plate, SHALL be used for holding short material, or when holes larger than $\frac{3}{8}$ inch are being drilled. If the work should slip from the clamp, operator SHALL stop the machine before attempting to make any adjustment or repair.



(2) The drill SHALL be run at a safe speed and feed.

(3) When using hand feed, operator SHALL release pressure before point of breakthrough is reached.

(4) A file or scraper SHALL be used to remove burrs from the drill hole.

F. TRIP HAMMERS

(1) A safety device, to prevent accidental application of power, SHALL be provided. When making repairs or adjustments, a substantial wooden prop SHALL be placed under the hammer.

G. POWER PUNCHES AND SHEARS

(1) The machine SHALL be adjusted to suit the thickness of the material being processed.

(2) Die and punch SHALL be matched for size.



8.73G.(3)

8.73 G. (3) Power SHALL be shut off when adjustments are made to the machine.

(4) An automatic safety device, to prevent accidental application of power, SHALL be provided.

CHAPTER 9

HEALTH

LEGEND

CAPITALIZED TEXT--somebody was killed
by not observing these practices.

SHALL--denotes a mandatory requirement.
The SHALL's are capitalized for easy
reference.

SHOULD--denotes a recommended practice.

**It is the duty of each of us
to prevent accidents - and to
protect himself and others
from injury**



CHAPTER 9. HEALTH

CONTENTS

SUBJECT	PAGE
9.1 POLICY	
General	343
Medical Examinations...	344
Personal Expense.....	345
Government Expense..	345
9.2 DISEASE CONTROL	
General.....	347
Mental	347
Alcoholism.....	347
Heart and Circulatory	
Ailments.....	347
Physical Strain.....	349
9.3 SANITATION	
General	351
Drinking Facilities.....	351
Camp Sanitation	351
Food Rations	354
Certification of Food	
Handlers.....	355



9.1 HEALTH POLICY

9.11 GENERAL

(1) The Federal employee health program is designed to provide for health-service programs, but these SHALL be limited to on-the-job emergency medical and dental services, pre-employment and other examinations, referrals to private physicians and dentists, and preventive programs relating to health.

(2) The United States Public Health Service is authorized to cooperate in surveys and to make suggestions and recommendations on the institution of a program in any locality. The programs, however, SHALL be limited to localities where there are a sufficient number of Federal employees to warrant providing such services. This means that this type of program may never be available to the majority of Forest Service employees scattered over large geographical areas.

F. S. HEALTH SURVEY



(3) The Forest Service SHALL be interested in the health of its employees, not only as a matter of human welfare but also as a factor in effective management.

(4) An employee's health is an invaluable personal asset and SHALL be safeguarded.



9.11(5)

9.11 (5) Most of the measures that will promote health are up to the individual, but the Forest Service SHALL have some responsibilities.

a. Employees SHALL be urged to take advantage of community health services, such as chest X-rays and diabetes tests.

b. Employees SHALL be encouraged to take planned annual leave, and supervisors SHALL schedule work accordingly. Foregoing vacations and recreation SHALL be discouraged.

c. Work supervisors SHALL urge yearlong employees to use approximately their year's accrual of annual leave each year. They SHALL take specific steps to determine when these employees wish to take their leave. Supervisors and employees SHALL come to an agreement in advance as to the most appropriate time. Supervisors SHALL set a good example by arranging for and taking their own annual leave.



d. Supervisors SHALL urge office workers to take exercise and physical conditioning.

e. Employees, especially those over 45, SHALL not be assigned from an appreciable period of sedentary work directly to a strenuous job, such as fire fighting.

f. All employment officers SHALL employ only those physically and mentally fit for the job.

9.12 MEDICAL EXAMINATIONS

(1) Employees, especially those over 45, should be urged to have annual medical examinations.

(2) Official medical examinations SHALL be required under these circumstances:

a. Employees subjected to special strain or hardship, particularly on fire suppression (but not limited to this activity).

b. A medical examination for physical fitness for duty (after appointment) SHALL be made by a full-time Federal Medical Officer, if available.

(3) When no Federal Medical Officer is available, expense for examination SHALL be either at personal or Government expense.

a. Personal Expense:

1. Where employee shows signs of undue fatigue or physical incapacity but not to such an extent as to endanger Government property or personnel.

2. To determine fitness for retention (not endangering Government property or personnel).

3. Incident to appointment, reinstatement, restoration, or reappointment, except for restoration of returning veterans and employment of fire fighters.

4. If there is reason to question an employee's physical condition, he should be urged to undergo a physical examination by his personal physician.

5. The practices outlined in 9.12(3)a4 shall be mandatory if there is serious doubt that an employee is physically qualified to perform arduous work when such would be required. In this case, the doctor's report should be furnished to the supervisory officer.

b. Government Expense:

1. When circumstances indicate need for examination as a precautionary measure for protection of Government property or personnel, such as examination of fire fighter applicants.

2. Restoration of persons returning from military service.







9.2 DISEASE CONTROL

9.21 GENERAL

(1) Cases of mental illness SHALL be brought to the attention of the Field Personnel Officer. Such cases call for delicate and considerate handling and for psychiatric consultation as well as the usual medical consultation that may not be readily available in outlying areas.

(2) Alcoholism is more and more accepted as disease or illness rather than the result of lack of willpower or adequate moral standards. The work supervisor SHALL attempt to dissuade an employee from drinking too much.

a. In the early stages after a warning, disciplinary action for further excessive drinking will sometimes jolt an employee and help achieve correction.

b. For the chronic or near-alcoholic, medical attention SHALL be recommended. Leave with or without pay for treatment or hospitalization may be necessary. In serious cases the assistance of Alcoholics Anonymous SHALL be sought.

(3) Heart and circulatory ailments are the Number One Health Problem in the Forest Service. They kill twice as many of us as accidents do, and they cause 42% of our disability retirements. For permanent employees who have recovered from heart illness, and who



HEALTH

DISEASE CONTROL

are not eligible for employee compensation or disability retirement, or if eligible for optional retirement, do not elect to retire, their work supervisors SHALL:

a. Discuss with them their condition and wishes as to assignments, to their old jobs or new ones for which qualified.

b. Consult with their doctors and Federal or designated physicians as to their physical capabilities and the safety of assigning them to such jobs.

c. If the doctors so recommend, the employees will be allowed to resume their old or similar duties if they wish, or

d. They SHALL be reassigned, if they wish, to less strenuous jobs, if such are available and they are qualified. Assignment should be at the same grade if possible.

e. No employee who has had heart illness and has recovered SHALL be involuntarily reassigned unless the above procedures have been followed and the reassignment is the only solution.

(4) Employees should watch for these warning signals and see their doctor if any of them persists--
Dizziness.

Indigestion.

Leg Swelling.

Shortness of Breath.

Awareness of Heart Beat.

Pain in chest on exertion or excitement.

If any of these symptoms are acute, persistent, or recurring, employees need examination and diagnosis.

Other trouble breeders are overweight, either seasonal or progressive through the years.



Sudden physical exercise after periods of relative inactivity. Diet may be important. Talk to your doctor about the kinds and quantities of food that you eat.

(5) When an employee gets chest pains--

- a. Immobilize the victim at the first sign of pain.
- b. Have him stop and rest.
- c. Don't let him try to fight it or work it off.
- d. When the pain subsides, get the victim to a doctor as soon as possible.
- e. If the pain persists, he should be moved to a doctor anyway. The risk is greater if he doesn't see a doctor at once.

(6) Employee should follow these rules--

- a. Walk, don't run, up stairs.
- b. Don't eat too heavily at any one meal.
- c. Don't get overtired.
- d. Relax completely for 10 minutes twice a day.
- e. Keep weight normal.
- f. Keep out of arguments.
- g. Don't worry.
- h. Choose sports in which winning is secondary, and light relaxation and activity foremost.
- i. See your physician regularly.

(7) Work supervisors SHALL take steps to see that facilities are provided to ease the physical strain on individuals who spend an appreciable time operating equipment over rough roads or terrain, and may be subject to lame backs and kidney or bladder disorders.

YOUR BEST
EXERCISE -

PUSHING AWAY
FROM A
LOADED TABLE







9.3 SANITATION

9.31 GENERAL

(1) Work supervisors SHALL see that employees living in Government camps or quarters maintain a reasonable standard of personal cleanliness, which includes personal housekeeping as well.

(2) Work supervisors SHALL, first of all, set good examples in personal cleanliness.

(3) Health and sanitation surveys SHALL be conducted. Assistance of the United States Public Health Service and State and county health service personnel should be sought.

9.32 DRINKING FACILITIES

(1) Each water supply system, serving any administrative site or recreation area under our jurisdiction, SHALL be tested for purity annually or as often as necessary to insure continuous purity.

(2) Unsafe water supplies SHALL be condemned and plainly marked as unsafe. See 8.11(3).

(3) Where possible, corrective action SHALL be taken immediately to eliminate contamination.



9.32 (4) Sources of drinking water SHALL be protected from contamination at all times. See Water Developments and Sanitation Handbook, 1940.

(5) WELLS SHALL BE CLEANED ONLY BY QUALIFIED PERSONS. BEFORE DESCENDING, THEY SHALL USE CANDLE OR CANARY TO TEST WELL FOR POISONOUS GASES. WELL CLEANERS SHALL WEAR A SLING WHEN IN THE WELL. THEY SHALL ALWAYS HAVE A LOOKOUT HELPER AT THE SURFACE.

(6) Purification of water in emergencies SHALL be accomplished by using an appropriate form of chlorine, Chlorazene, or Halozone tablets, or by boiling the water for 10 minutes.

(7) Drinking water SHALL be obtained from safe sources and dispensed in individual sanitary containers if fountains are not available. Canteens SHALL be sterilized after use. Paper cups SHALL be used where practicable.



(8) When milk is provided for drinking purposes, it should be purchased in sealed bottles or cartons. Otherwise it SHALL be pasteurized (150° F. for 30 minutes) or boiled for 3 minutes.

9.33 CAMP SANITATION

(1) When authorized by the officer in charge, all burnable refuse should be burned.

(2) At temporary camps where fly-proof covers for garbage pits are not justified, a hole SHALL be dug and refuse covered currently with dirt.



(3) At more permanent camps, all refuse that cannot be burned SHALL be placed in flyproof pits. Flyproof garbage containers should be emptied and thoroughly cleaned every day.

(4) All garbage pits should be located below the source of water supply at least 50 feet from streams and the camp, and 100 feet from the kitchen.

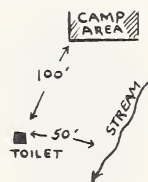


(5) During fly seasons, kitchen, mess room, toilets, and garbage pits SHALL be treated frequently with chloride of lime, DDT, or other suitable insecticide.

(6) Permanent toilets SHALL be made flyproof and rodentproof.

(7) Temporary toilets, as a general rule need not be flyproof but SHALL be sprinkled daily with dirt, ashes, or lime and sprayed with DDT. Latrines SHALL be constructed adjacent to fire bedding grounds.

(8) Toilets SHALL be located on the downstream side, at least 100 feet from camp and 50 feet from nearest stream, where there is no danger of their contaminating the water supply. See Water Developments and Sanitation Handbook, 1940.



(9) Disposable plates, cups, and eating utensils should be used when possible.

(10) After use, regular dishes and utensils SHALL be thoroughly washed with hot water and detergents or soap, and then immersed for 2 minutes in



scalding water, 170° F. or hotter, or boiled for 1 minute. Dishes SHALL be air dried.

(11) All camps SHALL be kept in sanitary condition by--

a. Maintaining a clean supply of free towels and toilet paper at all times.

b. Shaking and airing bedding each week.

c. Keeping personal effects clean.

d. Keeping cabins and tents clean and sanitary.

e. Keeping subsistence supplies carefully stored and protected from weather, flies, and rodents.



(12) Food Rations

a. If there is any doubt about the usability of canned rations or other food, they SHALL be destroyed. Food that is abnormal in appearance, taste, or odor SHALL not be eaten.

b. Meat component cans of C, K, and similar rations SHALL be destroyed if not used within 5 years after packing date.

c. All persons issued canned food for fire fighting or any purpose SHALL check packing date if available and closely examine contents before eating.

d. At storage facilities, cases of C rations under 3 years old SHALL be inspected at least once a year for spoilage.

e. At field camps or other points of consumption, rations to be issued SHALL be thoroughly inspected if rations are 3 to 5 years old, or if there is evidence of damage or spoilage regardless of date of pack. Spoilage criteria are leaky, severely rusted,



swelled, weakened, or dented cans, and contents with a flat, sour taste or mold growth.

(13) Prospective campsites should be inspected for poison oak, ivy, or sumac, poisonous insects, and snakes.



(14) Showers SHALL be kept clean and disinfected. Foot racks and mats SHALL be regularly exposed to good sunning.

(15) All corrals adjacent to occupied buildings SHALL be sprayed with insecticide.

9.34 CERTIFICATION OF FOOD HANDLERS

(1) Where neither the State nor the local community requires medical certification, no one SHALL be employed or assigned as cook or food handler, except in an emergency, without prior certification by public health authorities or a competent physician that he is free of communicable disease for purposes of handling food.

(2) Additional examination and certification SHALL be obtained if there is reasonable doubt of a food handler's continued freedom from communicable disease.

(3) Any existing local laws or higher standards covering food handling SHALL be obeyed.





INDEX

A

Accident
 definitions, 15
 investigation, 15
 report, 19
Adz, 236
Air hammers, 244
Airplanes
 cargo dropping, 38
 equipment, 35
 helicopters, 40
 parachutes, 37
 personnel, 34
 practices, 34
 responsibility, 33
Air tools, 244
Animals, 51
 hauling, 56
Arc welding, 228
Avalanche control, 114
Axes, 236

B

Barricades, 199
Bars, 240
Battery servicing, 318
Belts, 330
Blasters exam, 165
Blasting, 165
Blister rust eradication, 132
Boats, etc., 59
Boots, 43
Bottled gas, 97

Brick masonry, 196
Brush chippers, 270
Brush hooks, 236
Bucking and
 limbing, 132
Buffing wheels, 337
Buildings
 fire fighting, 80
 fire protection, 83
Bulkheads, 202

C

Cables, 220
Canopy, tractor, 259
Carbon tetrachloride, 306
Cargo dropping, 38
Cars
 repairs, 316
 servicing, 316
 travel, 25
Certificates, medical, 355
Chains, 223
Chemicals
 disposal of unused, 303
 laboratory, 299
 mixing, 302
 storage, 301
 used by Forest
 Service, 305
Chiggers, 48
Child safety, 120
Chimneys, 86
Chippers, brush, 270
Chisels, 242
Chutes, 37

Circular table saws, 332

Climbing trees, 138

Codes

color, 285

color ident. marking, 285

color standards, 289

Compressors, 319

Concrete & masonry, 195

Contracts, safety, 11

enforcement, 11

general clauses, 11

inspection, 11

special clauses, 12

Cooks, 355

Cranes, 264

Cranking, hand, 316

Creosoting, 159

Cruising, 151

Crushers, 269

D

Danger signs, 290

DDT, 307

Detonators, 165

Director's responsibility, 4

Discipline, 3

Disease control, 347

Divisional responsibility, 9

Draw knives, 239

Drill presses, 339

Drills, 334

Drinking facilities, 351

Drivers' permits, 25

Driving, car, 25

emergency, 30

Dump trucks, 29

Dwellings, 311

Dynamite--See Explosives

E

Electrical equip., 294

grounding, 292

installations, 291

repairs, 291

tools, 245

Electricity, 291

precautions, 295

rescue from, 298

Emergency driving, 30

End loaders, 261

Enforcement

responsibility, 9

Excavation, 199

Explosives, 165

disposal, 181

firing, 178

handling, 166

loading, 176

magazines, 167

misfires, 179

preparation, 174

storage, 167

transportation, 170

use, 174

wiring, 177

Extension cords, 294

F

Felling, 129

Fencing, 155, 199

handling wire, 155

stretching, 156

File cabinets, 311

Files, 239

Firearms, 125

Fire extinguishers, 65, 89

Fire fighting, 71
 buildings, 80
 car, 81
 equipment, 78, 84
 forest, 74
 gas, 81
 overhead, 72
 practices, 74
 travel, 77
 vehicle, 81

Fireplaces, 86

Fire plans, 83

Fire protection
 buildings, 83

First aid, 4

Flammables, 91

 liquids, 83

 materials, 87

 storage, 94

Flash points, 93

Floors, 326

Food handler certification, 355

Food rations, 354

Foot

 guards, 274, 286

 travel, 43

Foreman responsibility, 7

Form work, 195

Fusees, 97

Fuses, 293

G

Garbage disposal, 352

Gas

 bottled, 97

 heaters, 314

 monoxide, 321

 propane, 99

Gasoline, 83

 fires, 81

 storage, 94

Girdling, 134

Glass handling, 327

Goggles, 274

Good housekeeping, 328

Good office practices, 312

Graders, 261

 maintenance, 264

 operation, 262

 public protection, 262

Gravel pits, 204

Grease pits, 317

Grinding wheels, 335

Grounding electrical
 equip., 292

Grub hoes, 240

Guardrails, 199

Guards

 foot, 274, 286

 machinery, 249

H

Hammers, 242

Handrails, 326

Handtools, 235

 power, 244

Hand trucks, 240

Hard hats, 276

Hatchet, 236

Health policy, 343

Heaters, 314

Helicopters, 40

Highway safety, 110

Hitching, 257

Hoists, 224

Home safety, 117

Horse riding, 53
 packing, 55
 shoeing, 58
 trucking, 56
Horse scaffolds, 213
Hot water tanks, 313
Hunting safety, 126
Hydraulic presses, 339

I

Ice harvesting, 68
 safety, 67
Individual responsibility, 8
Insecticides, 48
Inspection, machine, 248
 contract, 11
Inspector's responsibility, 5
Investigations, 17

J

Jacks, 241
Jackhammers, 244
Job
 instruction, 4
 planning, 7, 300
Jointers, 331

K

Kerosene heaters, 314
Knives, draw, 239
Knots, 219

L

Laboratory work, 299
Ladders, 209
Lathes, metal, 338
 wood, 335

Leg guards, 274
Life preservers, 60, 277
Lifting, 324
Lightning, 103
Limbing and bucking, 132
Live wires, rescue
 from, 298
Lookout job, 81
Lost persons, 45

M

Machete, 236
Machine equipment
 air hammers, 244
 compressors, 319
 crushers, 269
 graders, 261
 guards, 249
 hitching, 257
 inspection, 248
 shops, 335
 shovels, 264
 signaling, 250
 tractors, 254
 transportation, 252
Masonry & concrete, 195
Material handling, 326
Mattocks, 240
Mauls, 242
Medical
 certificates, 344
 examinations, 344
Metal shops, 329
Mineral surveys, 152
Mixers, concrete, 197
Monoxide gas, 321
Mud flows, 149

N

Nitrocellulose film, 100

O

Offices, 311
 Off the job safety, 117
 Oil houses, 92
 Oil heaters, 314
 Oxyacetylene welding, 229

P

Packing, animal, 55
 Paints, flammable, 96
 Parachutes, 37
 Picks, 240
 Pike poles, 241
 Piling instructions, 323
 Pilots, 34
 Pits, grease, 317
 Planers, 332, 338
 Planting
 hand, 135
 machine, 136
 Platforms, 196
 Poison
 chemicals, 299
 food, 354
 insects, 47
 plants, 46
 monoxide, 321
 snakes, 49
 Poisoning trees, 138
 Policy, safety, 3
 health, 343
 Post & pole scaffolds, 214
 Power handtools, 244
 Powerlines, 111, 295
 Power punches, 339
 Power saws, 245
 Power shears, 339
 Power shovels and
 cranes, 264

Procurement officers, 4
 Propane tanks and
 torches, 99
 Pruning, 134
 Public safety, 109, 262
 aviation, 111
 recreation, 113
 traveling, 110
 Pulaskis, 236
 Pulleys, 224

Q

Quarries, 205

R

Radio, 185
 Radioactive material, 161
 Railroad speeders, 31
 Recreation, 113
 Recruiting, fire, 71
 Regional Forester's
 responsibility, 4
 Repairing cars, 316
 Repair shops, 315
 Report, accident, 19
 Rescue and search, 109
 from live wires, 298
 Respirators, 277
 Responsibility
 airplanes, 33
 all-Service, 3, 8
 directors, 4
 divisions, 9-10
 enforcement, 9
 individuals, 8
 inspectors, 5
 regional forester, 4
 supervisory officers, 6
 Retaining walls, 202

Rigging, 219
Riveting scaffolds, 214
Roads and trails, 147
Rope, 219
 safety, 278
Rubber gloves, 278
Runways, 196

S

Safety, 88
 belts, 278
 cans, 95
 equipment, 249, 273
 nets, 278
 off the job, 117
 ropes, 278
 shoes, 274
 signs, 289
Sales, timber, 141
Sanders, 335
Sanitation, 351
Saws,
 band, 333
 bow, 238
 circular, 332
 crosscut, 239
 cutoff, 333
 hand, 238
 power, 245
Scaffolds, 211
 horse, 213
 post and pole, 214
 riveting, 214
 single pole, 216
 swinging, 213
Scaling, 142
 on land, 143
 on water, 145
Scrapers, carryall, 259
Screwdrivers, 243

Seaplanes, 36
Search & rescue, 109
Servicing
 batteries, 318
 cars, 316
Shapers, 331, 338
Sheaves, 224
Shoes, safety, 274
Shovels
 hand, 241
 machine, 264
Signals, hand, 250
Signs
 caution, 290
 danger, 290
 direction, 290
 fluorescent, 289
 information, 290
 instruction, 290
 safety, 289
Sledges, 242
Slides & mudflows, 149
Smokejumping, 40
Snakes, 49
Snow surveys, 153
Solvents, 318
Special uses, 113
Stairways, 326
Static electricity, 92
Steam hose, 320
Stone masonry, 196
Storage
 chemicals, 301
 explosives, 167
 tool, 236
Stoves, 84
Supervisory responsibility, 6
Surveying, 151
Swinging
 scaffolds, 213

T

Tackle blocks, 224
 Tanks
 hot water, 313
 propane gas, 99
 Telephone, 186
 climbing, 189
 dismantling, 193
 equipment, 187
 limbing, 192
 pole & tree work, 188
 pole raising, 189
 taking up wire, 193
 wire stringing, 192
 working aloft, 191
 Ticks, 47
 Timber operations,
 tractor, 259
 Timber sales, 141
 Timber scaling, 142
 Timber stand improve-
 ment, 129
 Toilets, 353
 Toolboxes, 236
 Torches, backfiring, 79
 Towing, 257
 Tractors, 254
 adjustments, 258
 carryall, 259
 driving, 255
 hitching & towing, 257
 scrapers, carryall, 259
 terracing oper., 260
 timber oper., 259
 Trailers, 30
 Trails, work, 148
 Training, fire, 71
 Travel
 air, 33
 animal, 51

Travel--Cont.

 boats, etc., 59
 car, 25
 foot, 43
 public, 110
 winter, 44
 Tree climbing, 138
 felling, 129
 poisoning, 138
 Trench excavation, 201
 Trip hammer, 339
 Truck driving, 28
 explosives, 170
 guardrails &
 steps, 28
 loading &
 hauling, 28

V

Vents, gasoline, 94
 Vents, stove, 314

W

Warehousing, 323
 Water supply, 351
 Water travel, 59
 Wedges, 241
 Welding, 227
 Wheelbarrows, 242
 Winter travel, 44
 Wire
 handling, 155
 stretching, 156
 Wire rope, 220
 Wood preserving, 159
 Woods emergencies, 45
 Woodsmanship, 43
 Woodworking shops, 331
 Wrenches, 243



